

PERCEIVED RISKS AND THE AUDITOR'S DECISION PROCESS

By

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This study addresses the effects of conflicting risk on the decision process of a decision-maker bound by professional standards. The independent auditor is chosen because auditors are widely recognized as being guided by professional standards. In addition, auditors face several different types of risk when making a decision, and many of these risks are conflicting. This study focuses on the decision-process effects of two specific conflicting risks facing auditors: the risk of litigation and the risk of dismissal by the client. A model of the auditor's decision process under risk is developed and tested in an experimental setting. The auditor's perceptions of risk are measured and the effects of these risks on search process, information evaluation, and final decision are studied in an auditor reporting setting. The results from the experiment indicate that perceived risks have a strong effect on the final outcome of the auditor's decision process. In general, perceived risks increased the quantity of information sought by the decision-makers and caused the decision-makers to evaluate the information in the direction of minimizing the

perceived risk. There was no evidence that perceived risks caused a shift in the decision criteria of auditors. However, information search and evaluation led the auditors to make the less risky choice. These results provide some initial evidence on the extent and location of risk effects in the decision process of a decision-maker bound by professional standards.

CHAPTER 1 INTRODUCTION AND MOTIVATION

Introduction

When making a decision facing risk, decision-makers often lean toward making the less risky decision in all aspects of the decision process, from information search, to information evaluation, and finally to the ultimate decision. This result is robust to many different risk situations and decisions. However, little is known about the effects of risk on the decision process of a decision-maker bound by professional standards. The location and extent of any risk effects in the decision process of such decision-makers is critical to proposing solutions to counteract any bias. In this study, I investigate the effects of risks on the independent auditor.

I choose the independent auditor because it is widely acknowledged that an auditor is guided by professional standards (Houston et al. 1999). In addition, when making a decision, an auditor often faces several different types of risk. Some of these risks are consistent in nature, while others are countervailing, or conflicting. In this study, I address two specific audit risks: the risk of litigation and the risk of dismissal by the client. These two risks are likely to be countervailing. Since they are not directly measurable, I will focus on the auditors' perception of these risks. I use these two types of risks as incentive instruments to affect auditor decisions and behavior. The research design is experimental and requires auditors to perform a decision task in situations that represent combinations of these two types of risks.

In designing this study, I use the findings of earlier work on the effect of risks on auditor decision making (Louwers 1998; Hackenbrack and Nelson 1996; Cuccia et al. 1995). I extend these works to address the effect of countervailing incentives on information search and information evaluation. I implement these aspects of the decision process by having the subjects select the cues they consider most diagnostic. However, unlike prior studies on information search (Cloyd and Spilker 1999), subjects are not provided with a menu from which to choose. Thus, similar to a typical audit decision, the subjects must request information without being exposed to the entire available information set. The search for cues without a menu will provide data usable in identifying patterns in the decision process. For this reason, the subject's search will be traced. A second source of identifying the decision process will be the scores that each subject assigns to the cues they choose and the manner in which they update their beliefs. At any point during their search, the subjects may terminate and make a decision. At that point, they will also report their assessment of the likelihood of being sued or dismissed.

In this research, I also use prior research on perceived risks (Weber and Milliman 1997; Sitkin and Weingart 1995) to predict patterns in the subjects' behavior. I hypothesize that auditors perceiving high levels of one of the risks will behave similarly to other decision-makers not bound by professional standards. Specifically, I hypothesize that auditors will search for more evidence before making a decision that contradicts a salient risk than will auditors not facing the high perceived risk. In addition, I hypothesize that auditors facing the high perceived risk will be more likely to evaluate evidence as supporting the less risky choice and will require more extreme beliefs before terminating and making the riskier choice. For these reasons, auditors will, as in prior

research on the effects of risk, be more likely to make the perceived less risky choice despite being guided by professional standards.

Motivation

Risks have been shown to influence the human decision process. For example, decision-makers will often seek information confirming a less-risky choice (Einhorn and Hogarth 1978) and place more relevance on information found that confirms the less-risky choice (Snyder and Cantor 1978). These results appear robust to many different risks. However, the literature on perceived risks has not fully addressed the influence of professional standards in correcting these and other decision process biases. While prior literature has studied the effects of risk on the final decisions made by decision-makers bound by professional standards (Louwers 1998; Hackenbrack and Nelson 1996), the extent and location of any bias arising from the consideration of perceived risk by these decision-makers is unknown and is an empirical issue. Specifically, in the decision process, it is not known where incentives associated with perceived risk may be operationalized and may affect the professional's judgment.

The independent auditor is often viewed as a decision-maker guided by professional standards (Houston et al. 1999). These professional standards indicate that the auditor must remain free from bias when making decisions. However, the auditor differs from other decision-makers only in the sense of being bound by these standards. Thus, the independent audit is a situation where the effect of perceived risks on the decision process of a person bound by professional standards may be studied.

The study of the effect of perceived risks on the decision process of a decision-maker bound by professional standards is particularly important when considering the

incentive systems generally present. For example, current enforcement of auditor behavior is aimed toward ex-post sanctions. While ex-post sanctions can lessen the effects of deliberate bias, most decision-making bias is not deliberate. In fact, Bazerman et al. (1997) assert that ex-post sanctions cannot lead to independent decisions. Support for this argument in the risk literature can be found in Loewenstein et al. (1993), who demonstrate that subjects make decisions that favor their position even in the face of financial incentives to eliminate bias. Thus, the positioning of an agent will often lead to bias in decision-making, even if the bias is unintentional.

Because of the potential for unintentional bias in the decision process, the greatest potential for promoting decision-making in line with professional standards involves locating the extent and timing of risk effects in the decision process. By locating these effects, decision aids may be designed to minimize the effects of risk at specific locations in the human decision process. This study addresses this need by investigating the location and magnitude of risk effects in the decision process of a specific decision-maker bound by professional standards, the independent auditor.

Summary of Findings

This study examines the effects of conflicting perceived risks on the decision process of an auditor. The experiment was designed to isolate the effects of perceived risk of litigation and perceived risk of client loss on the information search, evaluation, and final decision-making of experienced auditors. The results from the experiment indicate that perceived risks have a strong effect on the final outcome of the auditor's decision process. In general, perceived risks increased the quantity of information sought by the decision-makers and caused the decision-makers to evaluate the information in the

direction of minimizing the perceived risk. There was no evidence that perceived risks caused a shift in the decision thresholds of the auditors. However, information evaluation led the auditors to make the less risky choice.

Dissertation Outline

The remainder of this dissertation proceeds as follows. Chapter 2 presents a review of the relevant literature, particularly the literature on perceived risks and on litigation risk to auditors. Chapter 3 introduces a model of decision-making under perceived risk and develops hypotheses related to auditor decision processes under risk. Chapter 4 presents the experiment examining the effects of perceived risk of litigation and perceived risk of client loss on the auditor's decision process. Chapter 5 discusses the results of the experiment and their implications for future research.

CHAPTER 2 LITERATURE REVIEW

In this chapter, I present a discussion of perceived risks in general, and also a discussion of litigation risk to auditors. While the hypotheses developed later in this dissertation are generated from a specific model of perceived risk, it is helpful to discuss the concept of perceived risk as it is presented in the literature to give an overall background on the concept of perceived risk. The discussion of perceived risk concentrates primarily on the different models presented in the literature, and on advances in the study of perceived risks. It is presented with the intent of demonstrating that perceived risk is an appropriate measure of risk, as interpreted by the decision-maker. The specific discussion of litigation risk to auditors is presented to demonstrate that risk is a legitimate concern to auditors, and that there are specific situations in which auditors are likely to *perceive* a high degree of risk. While there are many types of risk in an audit, litigation risk is used as a detailed example to illustrate that specific characteristics of an audit are likely to generate a perception of risk to the auditor, and that the implications of these risks can be significant. The general topics discussed in this section are used in Chapter 3 to develop hypotheses about the effects of perceived risk on the auditor's decision process.

Discussion of Perceived Risk and Perceived Risk Attitudes

Decision making when there is uncertainty as to the outcome after an action is generally referred to as risky choice. The term risk is often defined in terms of "the chance of injury, damage, or loss" (Webster's dictionary) or as engaging in activities "which could result in both negative and positive consequences" (U.S. Department of Health and Human Services, 1992). Until recently, however, no explicit theory of risk and behavior under risk was developed. Primarily, this was the result of the dominance of the belief in expected utility theory, as developed by von Neumann and Morgenstern (1947). Under expected utility theory, the risk level of a decision is measured by the variance of the outcomes. Thus, decision-making under expected utility theory is generated by following a utility function measuring the risk aversion of the actor, where risk aversion refers to the level of preference of a sure thing over a gamble of equal expected value. Risk is demoted to an objective measure, viewed equally by all actors as the variance of the outcomes.

Over the past twenty years, there has been significant research by Kahneman and Tversky (1979), Slovic and Lichtenstein (1983), and many others demonstrating human preferences and risky decisions that often vary significantly from expected utility theory. Several attempts have been made to model risk as a human perception separate from the variance of the outcomes. Luce (1980) proposed several measures of risk that involved human judgment. In addition, Coombs (1975) provided a conceptualization of decision making under risk as a non-prescriptive decision, influenced by human perceptions. Since that time, many researchers have provided significant advances in developing a behavioral decision theory that contributed to our understanding of decision making, risk

management, and regulation of risk (Luce and Weber 1986, Weber and Bottom 1989, Weber and Milliman 1997, Sitkin and Pablo 1992, Slovic, et al. 1984).

In this discussion, I address several of the conceptualizations of risk perceptions and risky-decision making developed in the literature. I also discuss some of the empirical findings relating the conceptualizations back to actual human decisions.

The Psychometric Risk Dimensions Model

Slovic et al. (1986) developed the psychometric risk dimensions model under commission of the Nuclear Regulatory Commission (NRC) to describe the perceptions of health and safety risks. The NRC was concerned with the observation that despite repeated attempts to educate the public about the limits of risks associated with nuclear power activities, the perceptions of risk by the public always overestimated the potential dangers. This was one of the first successful attempts by researchers to determine which attributes of a risky situation relate directly to risk perceptions and human decision making.

Before this study, the work of Kahneman and Tversky (1979) had documented a seemingly anomalous pattern of decision-making, which the authors referred to as Prospect theory. In their research, humans approached decision making under loss and gain domains with differing risk preferences. Tversky and Kahneman (1981) continued to document other biases in human decision-making, but were not making progress on an underlying theory of the perceived risks and preferences for these risks.

The work of Slovic et al. (1984, 1986) made substantial steps in this direction. The psychometric risk dimensions model identified several factors that contributed to the risk perceptions of human decision-makers. Most importantly, the results of these scaling

methods and multivariate analyses indicated that perceived risk is quantifiable and predictable (Slovic et al. 1984). In addition, the word "risk" means different things to different people. However, seven psychological risk dimensions were identified that explained a large percentage of the variance in human risk perceptions. Most important among these were "dread," the degree to which the negative consequences were feared, "control," the amount of control the person had over the consequences, and "catastrophic potential," the worst-case scenario. Holtgrave and Weber (1993) demonstrated that these factors also are significant in human decision making involving financial decisions.

Conjoint Expected Risk

Luce and Weber (1986) built off the initial quantification of risk proposed by Luce (1980) and further developed using empirical findings by Weber (1984) to develop a model of *conjoint expected risk (CER)*. The model gives relative weights to probability information and outcome information. Through the model, perceived risk is defined as a function of the decision-maker's personal preferences toward outcome levels, as well as outcome probabilities.

The model develops a linear, weighted combination of the probability of breaking even, the probability of a positive outcome, the probability of a negative outcome, the conditional expectation of positive outcomes, and the conditional expectation of negative outcomes. Weber and Bottom (1989,1990) provided empirical evidence that the additive nature of the model was superior to prior models measuring perceived risk as a multiplicatively separable construct (Fishburn 1982).

The importance of the CER model is that it provides motivation for measuring risk perceptions by showing that a model of risk can accurately describe the decision

making of humans. Further support for this model was later provided by Holtgrave and Weber (1993), who demonstrated that the model applied well to several different disciplines. In addition, they showed that the combination of the CER model with the model of psychometric risk dimensions (Slovic et al. 1986) provided an excellent way to model both objective measures (through the CER) and emotional measures (through the psychometric model) of risk perceptions.

Relationships Among Risk Perception, Risk Preference, and Risky Decisions

The conceptualization of risky choice took an additional step with the work of Sitkin and Pablo (1992). The authors characterized choice as a function of *decision risk*. Decision risk is defined as “the extent to which there is uncertainty about whether potentially significant and/or disappointing outcomes of decisions will be realized” (Sitkin and Pablo 1992). Decision risk has two primary components, according to Sitkin and Pablo (1992): *risk perception* and *risk propensity*. Risk perception is defined as “an individual's assessment of how risky a situation is in terms of probabilistic estimates of the degree of situational uncertainty, how controllable that uncertainty is, and confidence in those estimates” (Sitkin and Pablo 1992). This definition corresponds with the prior literature. *Risk propensity* is the 'individual's current tendency to take or avoid risks (Sitkin and Pablo 1992). The authors defined risk propensity as a changing construct. This differed from several prior models, particularly Fishhoff et al. (1981). In addition, while the concept of changing risk propensity carried some empirical validation (MacCrimmon and Wehrung 1986), the idea of changing risk propensities violated many assumptions of expected utility theory and risk-return theory.

Sitkin and Pablo (1992) modeled risk propensity as a function of outcome history. This was supported by prior research (Osborne and Jackson 1988, Thaler and Johnson 1990). From here, the decision-maker's level of risk propensity would directly affect decision making. The construct of risk perception was modeled as a function of problem framing (Kahneman and Tversky 1979), as well as several other elements. The authors then directly linked risk perception to risky choice.

Sitkin and Weingart (1995) tested the Sitkin and Pablo (1992) constructs, and found that risky choice behaved similar to their model, except that risk propensity was mediated by risk perception in making a risky decision. Risk perception appeared to assume many of the effects of risk propensity. This brought further doubt about the construction of risk propensity as a variable trait, because the variability in risk propensity appeared to overridden by risk perceptions.

Perceived Risk Attitudes

To this point, the research on risk and its influence on human decision-making had identified two primary psychological attributes contributing to the ultimate decision. First, a human had a *risk perception*, the measure of how much risk was present in a situation. Second, the decision-maker had a *risk preference (or propensity)*, a measure of the risk aversion or risk-taking preferences of the person. The major anomaly to expected utility theory was that various methods of measuring risk preference would result in different specifications of preferences by the decision-maker (Slovic 1964, MacCrimmon and Wehrung 1990). In addition, even when the same measurement methods were used, decision-makers often exhibited different levels of risk-taking or risk

aversion across different decision domains (MacCrimmon and Wehrung 1986, Schoemaker 1990).

Weber and Milliman (1997) took a huge step toward explaining this anomalous behavior by simultaneously measuring risk perception and a construct they call *perceived risk attitudes*. Perceived risk attitudes relate directly to risk preferences and are a measure of the level of risk aversion or risk-taking of the decision-maker, *taking into account risk perception*. Weber and Milliman (1997) found that after taking into account the perceived risk of the decision-maker, the perceived risk attitude was consistent across domains for most subjects. In light of expected utility theory and risk-return conceptualizations in finance (Bell 1995), a finding that human risk aversion or risk-taking is fairly consistent across domains is comforting and enables researchers to focus closely on risk perception as the main varying element in human decision making. Although prior literature documented that "economic" risk preferences appear to differ by situation, perceived risk attitudes appear to be more stable across situations. Risk perceptions appear to give the clearest picture of human choice in risky situations.¹

Discussion of Litigation Risk to Auditors

The purpose of this discussion is to elaborate on the potential litigation risks facing independent accountants as they conduct an audit. The notion is that a study of the real litigation risks facing auditors is likely to identify factors that influence the auditor's *perceived risk* of litigation. Latham and Linville (1998) recently conducted a thorough review of the academic literature on auditor litigation. This discussion elaborates on the

¹ See Weber (1997) for a discussion relating perceived risk and perceived risk attitudes back to economic frameworks.

literature on factors related to the risk of litigation. I also discuss several articles published after Latham and Linville (1998). I divide the risk issues into three categories: client characteristics, auditor characteristics, and market characteristics. I conclude with a brief discussion about the consequences of litigation to auditors.

Client characteristics

Most documented characteristics surrounding auditor litigation involve risk elements of the client. The business of the client appears to provide some indication of the risk of litigation arising. Auditors of companies in high-tech industry (Palmrose 1988, Francis, et al. 1994, 1998) and other manufacturing (Palmrose 1988, Stice 1991) are subject to most auditor litigation. One of the primary reasons for this is likely the asset structure of companies of these types. Various components of asset structure are related to the risk of litigation. Stice (1991) documented a prevalence of litigation among firms with high ratios of accounts receivable to total assets, as well as high ratios of inventory to total assets. Lys and Watts (1994) similarly documented that high levels of accruals were correlated with the incidence of litigation involving auditors. In addition, companies with larger amounts of total assets have a higher risk of auditor litigation (Lys and Watts 1994, Carcello and Palmrose 1994). The higher risk of errors and irregularities in these companies presumably accounts for the increased risk of litigation.

Another major factor in the assessment of client-specific litigation risk is financial distress (Stice 1991, Lys and Watts 1994, Carcello and Palmrose 1994). Higher levels of financial distress are correlated with significantly higher levels of auditor litigation. Pratt and Stice (1994) indicate that auditors price this into the audit in the form of a fee

premium. However, Simunic and Stein's (1996) analysis indicates that the fee premium is a result of higher levels of auditor effort, not a premium related to litigation risk. The correlation between financial distress and litigation against auditors is likely the result of two events related to financial distress.

First, financial distress sometimes results in bankruptcy. Bankruptcy has been shown to be a primary event triggering the filing of litigation against an independent auditor (St. Pierre and Anderson 1984, Carcello and Palmrose 1994). Second, firms in financial distress may have more incentive to engage in manipulation of accounting numbers. Fraud in the financial report is the other primary triggering event for auditor litigation (Palmrose 1987, Bonner et al. 1998). Because of these factors, high levels of financial distress in a client are the single most common risk factor associated with litigation against auditors (Stice 1991). Pratt and Stice (1994) indicate that auditors realize the risk associated with financial distress and consider it the single highest factor in assessing litigation risk in the audit.

In addition to financial distress, Lys and Watts (1994) documented that the probability of an acquisition is also highly correlated with auditor litigation. This is likely related to management incentives to manipulate financial statements around potential acquisitions. One final client characteristic linked to litigation against auditors is dividend payments (Francis 1994).

Auditor Characteristics

The literature on auditor characteristics related to litigation risk is relatively sparse. The one consistent result is that Big 5 firms are subject to litigation a significantly smaller percentage of the time than are non-Big 5 firms (Palmrose 1988).

The argument given in the literature is that this is an indication of higher quality audits. More interesting than what is related to auditor litigation risk, researchers have been unable to link many auditor characteristics to litigation risk. For example, industry specialization by an auditor does not reduce litigation risk (Lys and Watts 1994). In addition, auditor tenure is not related to the incidence of litigation against auditors (Lys and Watts 1994). Auditor tenure has been presented as a proxy for lack of independence. Another factor presented is the ratio of total fees charged to the client/total fees of the audit firm. Mixed results are presented on this factor. Stice (1991) indicates that this crude measure of lack of independence is not related to auditor litigation, however Lys and Watts (1994) claim that the ratio is related to litigation.

One other characteristic related to the auditor is the willingness to issue a modified audit opinion. Carcello and Palmrose (1994) document that the risk of a lawsuit is decreased in the presence of a modified audit opinion. However, the variable for a modified opinion was not significant in multivariate analysis. Carcello and Palmrose also provide significant evidence that the mean payment by the auditor in a lawsuit is lower in the presence of a modified audit opinion.

Market Characteristics

I characterize as market factors items related to the auditee's business environment that are unrelated to the company-specific financial condition, industry, etc. Although many market-related factors have been suggested, only sparse documentation of actual correlations are provided in the literature. One major factor is the presence of the client's stock on a national public stock exchange (Palmrose 1988, St. Pierre and

Anderson 1984). Publicly traded companies pose a higher risk of litigation to auditors than do private companies.

Related to the presence of publicly traded equity, several articles have proposed that stock return levels and variance of stock returns are related to litigation risk to auditors (Stice 1991, Lys and Watts 1994, Francis 1994). However, only Stice (1991) found any evidence supporting this conjecture. While the variance and level of stock returns is likely a factor in many types of litigation, auditors do not appear to be subject to increased litigation risk based on the variability of the client's stock.

The general condition of the economy also appears to be related to the risk of litigation against auditors (Palmrose 1987). The incidence of litigation is higher, even after controlling for company financial condition, under poor economic conditions.

Summary of Litigation Risk Characteristics

Among all characteristics of engagements where there appears to be a higher risk of litigation, the most documented item is client financial difficulty. This risk factor is partially offset by the presence of a modified audit opinion. Other characteristics shown to be ex-ante related to litigation risk included the industry of the client, the asset structure of the client, the auditor type, and the likelihood of manipulation.

Summary

The primary implication of the prior literature on perceived risk is that human decision makers have the ability to quantify the level of risk they perceive in a situation and that this *perceived risk* can affect the decision made. The discussion of litigation risk to auditors indicates that specific characteristics in an audit increase the risk level.

Combining the two areas, prior literature suggests that auditors likely perceive a high level of risk in specific audit contexts, and that these high levels of risk may affect the decision process of the auditor. The following chapter elaborates on a specific construct of perceived risk and develops hypotheses about specifically how this perceived risk may affect the auditor's decision process.

CHAPTER 3 MODEL DEVELOPMENT AND HYPOTHESIS GENERATION

Decision Risk and Perceived Risk

To study the effects of perceived risks on decision making under uncertainty, I adopt a general risk model (Sitkin and Pablo 1992; Weber and Milliman 1997). The model focuses on *decision risk*. Decision risk is defined as “the extent to which there is uncertainty about whether potentially significant and/or disappointing outcomes of decisions will be realized.” (Sitkin and Pablo 1992). A decision is risky when there are extreme outcomes or high uncertainty about the eventual realization from the decision. The primary component of decision risk is *risk perception*¹.

Risk perception is defined as ‘an individual’s assessment of how risky a situation is in terms of probabilistic estimates of the degree of situational uncertainty, how controllable that uncertainty is, and confidence in those estimates’ (Sitkin and Pablo 1992; Weber and Milliman 1997; Bell 1995; Bettman 1973). Prior research indicates that perceived risk may cause a decision-maker to modify the decision process. Higher levels of perceived risk cause a decision-maker to be attracted to a specific, less risky decision (Weber and Milliman 1997; Sitkin and Weingart 1995). While this bias may not be conscious, it often leads to a biased decision process (Einhorn and Hogarth 1978). The

¹ A second aspect of decision risk is perceived risk attitude, the tendency for the decision maker to be attracted or repelled from risk (Weber and Milliman 1997). Weber and Milliman (1997) provide tests indicating that perceived risk encompasses perceived risk

subconscious desire to reach a specific decision may cause the decision-maker to seek more confirmatory evidence (Einhorn and Hogarth 1978), while failing to attempt to falsify the desired result (Klayman and Ha 1987). In addition, decision-makers often consider confirming information to be more relevant than disconfirming information (Bamber et al. 1997; Snyder and Cantor 1979).

One inherent problem in studying decision making under risk is the lack of a direct measure of the effects of risk, or even of risk itself. Thus, to study the effects of decision making under perceived risks, surrogate measures of choice and the decision process are necessary. Subjective expected utility theory (Savage 1954) provides a strong benchmark for discussing choice under perceived risk, and components of a sequential likelihood assessment model (Hogarth and Einhorn 1992) provide a surrogate measure for discussing the effects of perceived risks on the decision process.

Subjective Expected Utility

In its most basic form, Subjective Expected Utility (SEU) represents choice preferences over a spectrum of potential actions, X . The potential outcomes as a result of action X are dependent on a set of uncertain states, S . The consequence of action X if state s occurs is denoted by $x(s)$. For this example, assume the sets of X and S are finite. The likelihood of state s occurring is denoted by a subjectively determined probability, $p(s)$, providing a vector to describe action X : $(x(s_1), p(s_1); \dots; x(s_n), p(s_n))$, where the possible states are indexed from 1 through n . The goal of SEU is to mathematically represent preferences of actions using a utility index, u , and a probability measure, p ,

attitude. Thus, this research will focus on perceived risk as the primary component of decision risk.

such that an action X is strictly preferred to an action Y iff $SEU(X) > SEU(Y)$. If preferences satisfy certain axioms (Savage 1954), the SEU of X is defined as:

$$SEU(X) = \sum p(s)u(x(s)) \text{ for all } s \text{ in } S \quad (1)$$

The SEU model is normatively attractive for studying decision-making under perceived risk. Perceived risk as defined above involves the magnitude of potential outcomes and the likelihood of occurrence of these outcomes. Both components of perceived risk are contained in SEU. However, much documentation of human behavior is inconsistent with the model; the violations are reported in both the axioms and the likelihood assessments (Machina 1987; Tversky and Kahneman 1992). One alternative surrogate for analyzing probability assessment under perceived risk with a small number of outcomes is to use a descriptive, non-Bayesian model of likelihood assessment (Hogarth and Einhorn 1992). In addition, focusing on the payments that occur in different states may be used as a surrogate for the expected utility of the potential outcomes (Tversky and Kahneman 1992)².

Surrogate Model of Likelihood Assessment

The belief-adjustment model (hereafter BAM) (Hogarth and Einhorn 1992) suggests that a likelihood assessment is reached when analyzing a piece of evidence by adjusting the prior belief using an adjustment weight on the new evidence (i.e. anchoring and adjustment). The model is shown to reasonably characterize likelihood assessments

² SEU assumes that wealth is cumulative, but a substantial body of research indicates that the carriers of value in a decision are gains and losses, not final assets (Tversky and Kahneman 1992).

in auditor decision-making (Anderson and Maletta 1999; Krishnamoorthy et al. 1999; Bamber et al. 1997), and involves both evaluation of a piece of information, and the weighting of that information in likelihood revision. Thus, the model provides a potential surrogate for measuring the effects of perceived risk on information evaluation. The BAM is written algebraically as:

$$S_k = S_{k-1} + w_k s(x_k) \quad (2)$$

Where

S_k = degree of belief after evaluation of current piece of evidence, ($0 \leq S_k \leq 1$).

S_{k-1} = anchor or prior belief.

x_k = the k th piece of evidence.

$s(x_k)$ = subjective evaluation of the k th piece of evidence, ($-1 \leq s(x_k) \leq 1$).

w_k = the adjustment weight for the k th piece of evidence, ($0 \leq w_k \leq 1$).

$$= \alpha S_{k-1} \text{ when } s(x_k) \leq 0, \quad (0 \leq \alpha \leq 1). \quad (3)$$

$$= \beta(1 - S_{k-1}) \text{ when } s(x_k) > 0, \quad (0 \leq \beta \leq 1).$$

Replacing w_k with equation (3), the final formula for belief-adjustment becomes

$$S_k - S_{k-1} = \alpha(D)S_{k-1}[s(x_k)] + \beta(1-D)(1-S_{k-1})s(x_k) \quad (4)$$

Where $D=1$ when $s(x_k) \leq 0$, and

$$D=0 \text{ when } s(x_k) > 0.$$

The measurement of α , β , and $s(x_k)$ provide surrogates for the effects of perceived risks on the updating of likelihood assessments and the evaluation of evidence.

Studying Auditor Decision-Making Using Generalized SEU

Auditor decision-making is not a static process. Whereas SEU theory prescribes optimal decision-making at a point in time, auditors dynamically choose the amount of information gathered (Knechel 1990). Thus, after collection a piece of information relating to a hypothesis, the auditor selects from the following action set {accept hypothesis, reject hypothesis, gather additional information} (Knechel 1990; Knechel and Messier 1990). The primary implication is that the auditor's decision is not a binary choice comparing the subjective expected utilities of accepting or rejecting the hypothesis, $SEU(A)$ and $SEU(R)$. As long as information that could reasonably affect the decision remains, the auditor has the option to continue searching for additional information (within time constraints). This implies that the auditor's decision is not constrained to accepting or rejecting a hypothesis at any point in time³:

Accept Hypothesis if: $SEU(A) > SEU(R) + f(\text{confidence}, K-k)$

Reject Hypothesis if: $SEU(A) < SEU(R) - f(\text{confidence}, K-k)$

Otherwise, continue information search

where

$f(\text{confidence}, K-k)$ is a decreasing function of the auditor's confidence in the probability estimation and the depletion of relevant remaining evidence.

Thus, as relevant information wanes, or confidence increases, the auditor becomes more likely to accept or reject the hypothesis. In the limit (when evidence is gone or time has run out), the decision reverts to a comparison between $SEU(A)$ and $SEU(R)$.

³ This assumes that SEU is always scaled to be positive.

The SEU model can be generalized by analyzing the expected costs to the auditor of accepting or rejecting a hypothesis:

C_1 = Expected utility cost of a Type I error, rejecting the hypothesis when in fact it was correct.

C_2 = Expected utility cost of a Type II error, accepting the hypothesis when in fact it was incorrect.

The auditor makes a decision based on the likelihood of the hypothesis being true, and the costs associated with the Type I and Type II errors. In terms of the BAM, the auditor estimates a likelihood that the hypothesis is true, S_k . The auditor's decision after viewing information k is determined by the relationship of S_k to two thresholds: A_k , the likelihood above which the auditor will terminate information search and accept the hypothesis, and R_k , the likelihood below which the auditor will terminate search and reject the hypothesis. Replacing SEU with the generalized model, A_k and R_k are defined as:

$$A_k = C_2 / (C_1 + C_2) + f(\text{confidence}, K-k) \quad (5)$$

$$R_k = C_2 / (C_1 + C_2) - f(\text{confidence}, K-k) \quad (6)$$

This suggests that the auditors decision at any stage k is:

Accept Hypothesis if: $S_k > A_k$

Continue Information search if: $A_k \geq S_k \geq R_k$

Reject Hypothesis if: $S_k < R_k$

Intuitively, this implies that the auditor will continue searching unless he is sufficiently confident that the optimal choice will not change, or he lacks relevant evidence to improve his confidence. The auditor's sequential decision process is presented in Figure 1.

Setting for Studying Auditor Decisions under Perceived Risk

The auditor's reporting decision when the client is under severe financial distress (hereafter, the going-concern decision) is a setting that is likely to assist in evaluating the effects of perceived risks on the decision process. First, the relevant auditing standard, SAS 59, provides the auditor with limited guidance and with only vague criteria, "substantial doubt" (AICPA 1988). In addition, the auditor is faced with strong countervailing risks. Should the auditor issue a going-concern modification and the client subsequently remains viable, there is a strong possibility that the client will dismiss the auditor (Geiger et al. 1998, Krishnan et al. 1996, Chow and Rice 1982). However, should the auditor issue an unmodified opinion and the client subsequently fails, there is a strong possibility that the auditor will be subject to costly litigation (Carcello and Palmrose 1994).

Prior research (Dowling and Staelin 1994; Bettman 1970) indicates that decision-makers assess perceived risk as higher when they perceive the costs involved to be high, and when they are uncertain about the likelihood of a poor outcome. Thus, the auditor's going-concern decision setting represents a situation where the auditor may experience high perceived risk of litigation (hereafter PRL) or high perceived risk of dismissal by the client (hereafter PRD).

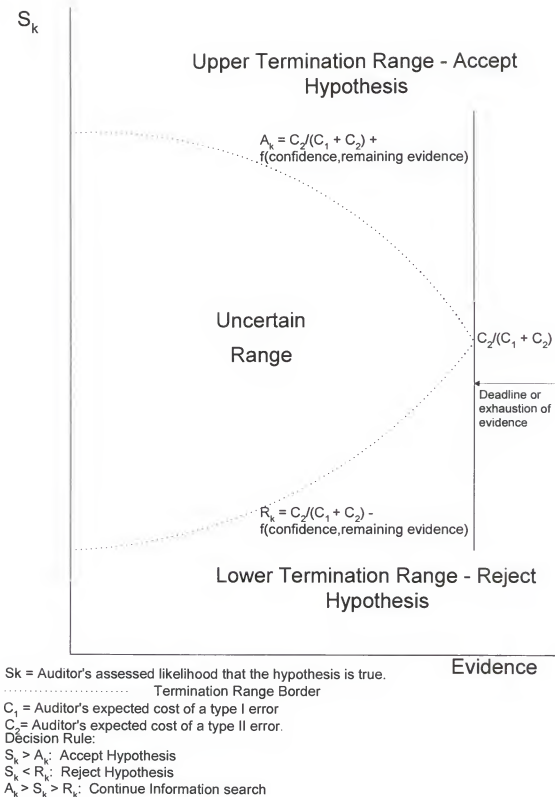


Figure 1. The Auditor's Sequential Decision

The effect of evidence evaluation

In the BAM, the auditor's subjective evaluation of evidence is measured by his assessment of a piece of evidence, $s(x_k)$, as well as by his weighting of the evidence w_k (as assessed through α , the weight on negative evidence from equation (4), and β , the weight on positive evidence from equation (4)). In testing the effects of risk on evidence evaluation, this study will focus on the assessment of a piece of evidence, $s(x_k)$, as well as the weighting of negative and positive evidence, α and β . In this study, the effects of perceived risk will be discussed from the hypothesis frame that the company will remain viable. This is consistent with auditing standards and prior literature (Asare 1992). Thus, S_k , represents the auditors assessed likelihood that the client will remain viable.

Prior research (Einhorn and Hogarth 1978; Snyder and Cantor 1979; Klayman and Ha 1987) indicates that decision-makers are biased to favor confirmatory evidence, while largely ignoring disconfirming evidence. In addition, decision-makers under risk are more likely to view information as supporting their desired findings.

In the audit decision model under SAS 59, this is directly related to the evaluation of contrary information and mitigating factors. An auditor with a high PRL will likely evaluate a piece of information as more indicative of subsequent failure than an auditor not under high perceived risk of litigation. Likewise, the auditor with high PRD will likely evaluate a mitigating circumstance as more indicative of subsequent viability than an auditor not under high perceived risk of client loss.

Hypothesis 1a: *Ceteris paribus*, for a given piece of evidence, higher perceived risk of litigation will result in auditors assessing $s(x_k)$ as lower than auditors not facing high perceived risk of litigation.

Hypothesis 1b: *Ceteris paribus*, for a given piece of evidence, higher perceived risk of dismissal will result in auditors assessing $s(x_k)$ as higher than auditors not facing high perceived risk of dismissal.

In addition, the relative weights given to the evidence will be skewed by perceived risks. As discussed above, decision-makers tend to place higher weights on information confirming their beliefs. Hogarth and Einhorn (1992) suggest that when a person has an investment in a particular belief, α and β will be affected by those beliefs. In this situation, perceived risk is hypothesized to cause auditors to “have an investment” in one decision outcome. Thus, the weights on positive (β) and negative (α) information are hypothesized to differ based on the perceived risks in the situation.

Hypothesis 2a: *Ceteris paribus*, auditors under high perceived risk of litigation will display a higher α and a lower β in the BAM than auditors not facing high perceived risk of litigation.

Hypothesis 2b: *Ceteris paribus*, auditors under high perceived risk of dismissal will display a higher β and a lower α in the BAM than auditors not facing high perceived risk of dismissal.

Search Termination

As discussed above, the decision criteria for the auditor in a sequential decision problem is defined in part by the relative costs and confidence in probability assessments. As such, it is likely that perceived risks may have an effect on the auditor’s decision thresholds, as well as the amount of information gathered. In the case of high PRD, C_1 is likely to be higher than in a base case situation, representing the higher costs involved in an incorrect modified opinion. Likewise, in the case of high PRL, C_2 is likely to be higher than in a base case situation, representing the higher costs involved in an incorrect unmodified opinion. In addition, prior research indicates that perceived risks are likely to lower the confidence of a decision maker.

Combining the effects of higher costs of the associated error and a decreased confidence level indicates that the level of the decision thresholds over stages will be different under high levels of perceived risk. Equations (5) and (6) suggest several relationships between the costs involved and the auditors decision thresholds. As C_1 increases, A_k will decrease. As the cost of incorrectly rejecting the hypothesis increases, the auditor will be more likely to accept the hypothesis. When C_2 increases, A_k will increase. As the cost of incorrectly accepting the hypothesis increases, the auditor will be less likely to terminate search early and accept the hypothesis. Similarly, when C_1 increases, R_k will decrease, representing the increased cost of incorrectly rejecting the hypothesis. When C_2 increases, R_k will increase, representing the decreased relative cost of rejecting the hypothesis.

Because high PRL increases C_2 , while decreasing confidence, the above discussion suggests that auditors facing high PRL will require a higher assessed S_k prior to terminating search and issuing an unmodified opinion. Likewise, because high PRD increases C_1 , while decreasing confidence, auditors facing high PRD will require a lower S_k before terminating search and issuing a modified opinion. Figure 2 shows the auditors decision thresholds under perceived risk.

Hypothesis 3a: Auditors facing high perceived risk of litigation will require a higher assessed S_k before terminating the search and issuing an unmodified opinion than auditors not facing high perceived risk of litigation.

Hypothesis 3b: Auditors facing high perceived risk of dismissal will require a lower assessed S_k before terminating the search and issuing a modified opinion than auditors not facing high perceived risk of dismissal.

Because auditors facing high perceived risks may require more extreme likelihood assessments to terminate search and issue an opinion counter to their perceived risks,

conflicting evidence will likely increase the amount of evidence required to issue a report. Specifically, for an auditor facing high PRL, ambiguous evidence will make it less likely that the auditor will assess S_k at a level greater than A_k while evidence remains, thus requiring a longer information search prior to issuing an unmodified opinion. A similar argument applies to the case of PRD.

Hypothesis 4a: Auditors facing high perceived risk of litigation will search longer for evidence prior to issuing an unmodified opinion than auditors not facing high perceived risk of litigation.

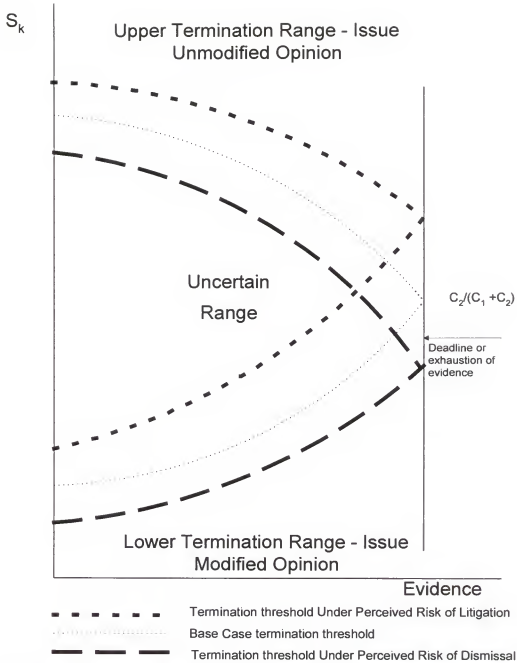
Hypothesis 4b: Auditors facing high perceived risk of dismissal will search longer for evidence prior to issuing a modified opinion than auditors not facing high perceived risk of dismissal.

The Influence of Perceived Risks on Ultimate Reporting Decisions

Hypotheses 1-4 predict that auditors will evaluate evidence in the direction of the decision most in line with their perceived risks, place more weight on information supporting that decision, require more extreme likelihood assessments, and require more information to issue an opinion counter to the decision most in line with their perceived risks. The combination of these factors indicates that the auditor's decision process may lead to a decision leaning in the direction of the perceived risks.

Hypothesis 5a: Auditors facing high perceived risk of dismissal will be more likely to issue an unmodified opinion than auditors not facing high perceived risk of dismissal.

Hypothesis 5b: Auditors facing high perceived risk of litigation will be more likely to issue a modified opinion than auditors not facing high perceived risk of litigation.



S_k = Auditor's assessed likelihood that the company will remain viable for the subsequent year.
 C_1 = Cost of issuing a modified opinion when the client remains viable.
 C_2 = Cost of issuing an unmodified opinion when the client subsequently fails.
 Note: Thresholds defined as in Figure 1.

Figure 2. The Auditor's Going-Concern Decision under Perceived Risk

The Effect of Countervailing Incentives on Auditors' Decision-Making

The most interesting case arises when the auditor is faced with high perceived risks in opposing directions. Equations (5) and (6) provide some basis for predicting the effects of countervailing high perceived risks. Specifically, while high PRL causes an increase in C_2 , high PRD causes an increase in C_1 . Thus, the effect on the decision threshold at the limit is indeterminate and depends on the ratio of the expected costs. However, with risks in countervailing directions, it is unlikely that there will be bias in the evaluation of evidence. Strong countervailing perceived risks will likely cause the auditor to be extensive in searching and careful in evaluation of evidence.

In addition, the decreased confidence caused by high perceived risks will increase the threshold A_k and decrease the threshold R_k in equations (5) and (6). Thus, in an ambiguous situation with strong countervailing risks, auditors will likely search for more evidence prior to reaching a decision on report type compared to auditors not facing strong countervailing risks.

Hypothesis 6: Auditors facing both high PRL and high PRD will search longer for evidence than auditors not facing both high PRL and high PRD.

CHAPTER 4 EXPERIMENTAL DESIGN

Experimental Method

Perceived risk of litigation (PRL) and perceived risk of dismissal (PRD) were manipulated in a 2 x 2 between subjects design. PRL was operationalized as the opinion of the audit firm's risk management department. Specifically, subjects in the low PRL treatment were told that "risk management consultants at your firm indicate that it is unlikely that your firm would be subject to litigation as a result of this audit." Subjects in the high PRL treatment were told that "risk management consultants at your firm have cautioned you that the client operates in an environment where litigation against auditors is common." PRD was operationalized as a statement made by the client regarding subsequent retention. Specifically, the low PRD treatment stated that "the original partner on the engagement recently met with management and was informally told that they intend to retain your firm as auditors in the future." The high PRD treatment indicated that "the original partner on the engagement has told you that management once indicated that they would likely hire a new auditor in the event of a modified audit opinion."

Case Development

The case was designed using actual firm-years from a manufacturing company selected using the criteria listed in Hopwood, McKeown, and Mutchler(1994). Mutchler's discriminant model (1983) was used to further identify candidate firm years.

The model has been used to predict going-concern modifications with high levels of accuracy. Firms near the cut-off range were then analyzed for substantial presence of both contrary information and mitigating factors.

The search yielded a report by a medium-sized technology firm with a predicted going-concern opinion, but possessing many contrary and mitigating factors. In addition, the auditors issued an unmodified opinion. Thus, the case was ambiguous¹.

Procedures

Participants were asked to review the working papers for a current year's audit engagement. They were told that the in-charge auditor had informed them of the possibility that the client may be unable to continue as going-concern and their task was to recommend an audit opinion.

Each participant was first asked background questions, including questions to elicit their ex-ante perceived risks. Next, they were presented with background information on the client, which included the manipulations. After the elicitation of perceived risks in the situation, the participants were shown a set of financial statements and were asked to make an initial assessment of the probability that the client would be able to continue operations for the subsequent year and their confidence in that assessment. After the initial assessment, the participants were given the opportunity to search a database containing information that is relevant to a going-concern decision². The information available included ratio analysis with industry comparisons, and other

¹ Pilot testing of the case without any mention of the risk manipulations also provided some evidence that the case was appropriately ambiguous.

² The use of a search engine is analogous to the actual audit situation where the partner selectively accesses various parts of the workpapers.

financial and non-financial information listed by auditors as being relevant to the going-concern decision (LaSalle and Anandarajan, 1996). The amount of time spent on each item, as well as overall decision time, was tracked by the network computer. The auditors were required to search for the information using key words or phrases. Thus, they were only presented with information they considered relevant. This allowed for stronger tests of information search termination.³ All subjects were given the opportunity to issue the opinion whenever they believed they had sufficient competent evidence to support an opinion. After each piece of information, auditors were asked to rate the information on an 11-point scale (-5,+5) of very negative to very positive. They were also asked to reassess the likelihood that the client would be able to continue in existence for the subsequent year and their confidence in that assessment.

Upon issuance of the opinion, the auditors were asked to list the factors that most highly influenced their decision, as well as answer a debriefing questionnaire. The instrument was accessed on the World Wide Web, with responses saved onto a network server. The experiment, along with search keywords and information cues, is shown in the appendix.

Subjects

Subjects were 48 managers from multiple offices of three Big Five CPA firms. These subjects were chosen because they generally provide substantial input to going-concern decisions. The subjects were distributed 24, 14, and 9 from the respective firms,

³ There is the possibility that given a sequence of information, no auditors will terminate before the end of the sequence. Requiring the auditors to search for the relevant information is more similar to an audit environment, where the relevant information is chosen, not provided as a sequence.

and there was no apparent clustering in any of the treatment conditions (see Table 1). The subjects were all at the manager and senior manager level, with a mean experience level of 6.40 years (range 4-12). Mean experience did not differ across treatment conditions ($F(3,44) = 0.14, p < 0.94$). Auditors with this level of experience are likely to have been involved with engagement risk assessments made during audit planning and have the ability to perceive risks in the situation. For this case, it was extremely important that the participants had substantial experience in evaluating clients under financial distress. All participants reported being involved in audit engagements where substantial doubt of subsequent viability had existed and this involvement did not differ between treatment conditions (mean = 7.5 audits, $F(3,44) = 0.06, p < 0.98$). Based upon this information, participants in the experiment appear to be sufficiently experienced to complete the task realistically.⁴ See Table 2 for additional descriptive information about the subjects.

⁴ The subjects reported that they found the case to be realistic (mean=5.54/7.0). The case realism did not differ across conditions ($F(3,44) = 0.09, p < .97$). The subjects also reported that they found the decision in the case moderately difficult (mean=4.40/7.0). The assessed difficulty of the decision was significantly different across cells ($F(3,44) = 10.35, p < .01$). Auditors in the condition with both risks found the case to be substantially more difficult than auditors in any of the other three conditions. This appears to be consistent with the expected effect of the conflicting risk treatment condition.

Table 1. Distribution of subjects by firm and treatment condition

	Low PRL ^b low PRD	Low PRL ^b high PRD	High PRL ^b low PRD	High PRL ^b high PRD	Total
Firm 1 ^a	3	2	2	2	9
Firm 2	4	3	3	4	14
Firm 3	5	6	7	6	24
Not Disclosed		1			1
Total	12	12	12	12	48

PRL = Perceived risk of litigation treatment condition

PRD = Perceived risk of dismissal by client treatment condition

^a Subjects were managers from three large "Big Five" accounting firms.

^b A Fisher Exact test was performed to test for differences in distribution of firms across treatment conditions. No significant differences were detected ($p = 0.99$).

Table 2. Descriptive Statistics

Mean (SD) range	Low PRL low PRD n=12	Low PRL high PRD n=12	High PRL low PRD n=12	High PRL high PRD n=12	Total n=48
Audit experience ^{a,c}	6.25 (2.01) 4-12	6.64 (1.21) 5-9	6.33 (1.44) 4-8	6.42 (1.24) 5-10	6.40 (1.47) 4-12
Failure experience ^{b,c}	7.33 (3.68) 3-15	8.00 (6.66) 3-25	7.58 (3.75) 3-15	7.25 (4.54) 4-20	7.53 (4.61) 3-25
Case realism ^{c,e}	5.42 (0.99) 4-7	5.58 (0.79) 5-7	5.58 (0.67) 5-7	5.58 (1.31) 3-7	5.54 (0.94) 3-7
Case difficulty ^{d,f}	3.50 (1.09) 1-5	3.83 (1.03) 2-6	4.67 (1.23) 2-6	5.58 (0.51) 5-6	4.40 (1.27) 1-6

PRL = Perceived risk of litigation treatment condition

PRD = Perceived risk of dismissal by client treatment condition

^a Audit experience was assessed as the number of years the subject had been in public accounting.

^b Failure experience was assessed as the number of audits participated in by the subject in which the client faced "substantial doubt" regarding ability to continue.

^c Case realism was assessed on a 7-point scale with 1 = "not realistic", 7 = "very realistic".

^d Case difficulty was assessed on a 7-point scale with 1 = "not difficult", 7 = "very difficult".

^e An ANOVA was run for this assessment across cells without any significant differences across cells ($p > 0.90$).

^f An ANOVA run for this assessment indicated that subjects perceived the situation with high litigation risk and high risk of dismissal to be significantly more difficult than the other three cells ($p < 0.05$).

CHAPTER 5 RESULTS AND IMPLICATIONS

Descriptive Data

Representatives of the respective firms distributed the case via an email including a hyperlink to the case website. A total of approximately 75 manager level auditors were contacted via email¹. The number of usable responses received was 48 (three auditors began, but did not complete the case). The approximate response rate was 64%.

The mean initial assessment of PRL was 3.42 (SD 1.80) on a 7-point scale across all treatment conditions. The mean initial assessment of PRD was 3.85 (SD 2.11) across all treatment conditions. The mean initial probability of survival was assessed at 66.04 (SD 11.25) prior to searching for any additional evidence. The subjects searched for and viewed a mean of 5.10 (SD 2.34) additional cues. On average, they spent 702.94 (SD 254.99) seconds to make the decision. The mean assessment of probability of survival subsequent to searching for and evaluating additional evidence was 58.15 (SD 19.14). 47.9% of all subjects recommended a report modification.

Figure 3 provides some initial evidence that the auditors behaved partially according to the decision model presented in Figure 1. As the auditors gathered more evidence, the upper termination range appears to have increased, leading auditors to

¹ The exact number of auditors who received the email is only approximate. One firm representative sent the email to “approximately 15” auditors. As responses are anonymous and participants self-report their employer, I am unable to precisely know the number of auditors receiving the email. Nine auditors self-reported that they were employed by this firm.

terminate their search and issue an unmodified opinion with lower probability of survival estimates. A regression analysis indicates that the slope of a regression of the probability of survival at termination on the number of information cues viewed is significantly negative for auditors issuing an unmodified opinion ($t=-3.47$, $p < 0.01$).

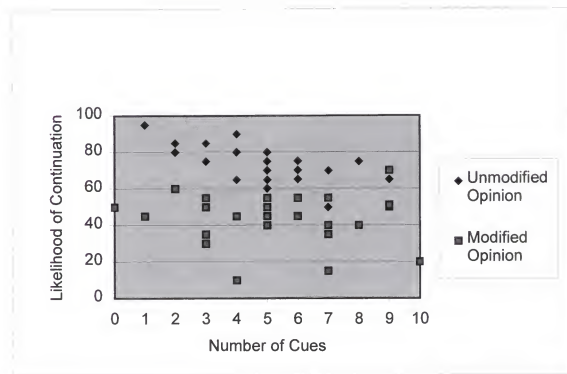


Figure 3. Likelihood Estimation at Termination Conditional on Number of Cues

The converse is not true ($t=.98$, $p = 0.33$). There is no evidence of a positive slope for auditors issuing a modified opinion. One possible explanation for the lack of a significantly increasing lower termination range is the nature of the auditing standard indicating a modified opinion if the auditor has substantial doubt. An auditor may be more likely to search for additional evidence prior to issuing an unmodified opinion when faced with a likelihood assessment where some doubt is present. However, there exists the possibility that “substantial doubt is substantial doubt”, meaning that upon assessing a

likelihood of survival below a certain criteria, the auditor is faced with substantial doubt and modifies the opinion. Another possibility is that the effect of the treatment conditions has eliminated a visible increase in the lower termination range. Further research will need to test the model presented in Figure 1 more carefully in a setting where standards are less likely to affect the termination ranges. Further tests of the hypotheses will provide additional support for other aspects of the decision model.

Manipulation Checks

In order to assess whether the risk treatments affected the perceived risks of the subjects, two questions were asked subsequent to the risk manipulations. First, to assess perceived risk of litigation, the subjects were asked, "Given the engagement information presented, how likely do you think it is that litigation against your firm could occur related to this client if you did not issue a modified opinion, but your client failed?" A second question was asked to assess the perceived risk of dismissal by the client. Subjects were asked, "Given the engagement information presented, how likely do you think it is that you would lose your client if you issued a modified opinion, but your client survived?" Both questions were answered on a 7-point scale, with 1 = "not likely" and 7 = "very likely".

As shown in Table 3, the treatments appear to have had the desired effect on the subjects' perceptions of risk in the situation. The mean assessment for PRL was 3.42 (SD 1.80), with responses ranging from 1-7. An ANOVA indicates that the PRL treatment produced a significant main effect. Subjects in the high PRL treatment assessed the initial PRL to be significantly higher than subjects not in the high PRL treatment ($F(1,44) = 92.61, p < 0.001$). There was no indication of differential

assessment of PRD between treatments of PRL, nor any interaction between the treatment variables². The mean assessment for PRD was 3.85 (SD 2.11), with responses ranging from 1-7. An ANOVA indicates that the PRD treatment produced a significant main effect. Subjects in the high PRD treatment assessed the initial PRD to be significantly higher than subjects not in the high PRD treatment ($F(1,44) = 275.77, p < 0.001$). There was no indication of differential assessment of PRL between treatments of PRD.

Information Evaluation

Hypotheses 1 and 2 related to the evaluation of information under risk. It was hypothesized that the auditor would be more likely to evaluate information as supporting the less risky choice. The experiment was designed to test these hypotheses throughout the information evaluation process. First, auditors were required to make an initial assessment of the probability of survival based only on the introductory information consisting of a set of financial statements and slight industry background information. Subsequent to the evaluation of the initial information, auditors were allowed to search for other information cues contained in the database. Following each cue the auditor found, he assessed the information on an 11-point scale (-5,5) based on the question, "In relationship to the ability of Highpoint to continue as a going-concern, how would you rate the evidence you are viewing on this page?" There were 24 additional cues available to the auditors. In addition, auditors were required to reassess the likelihood of survival following each cue viewed. Thus, Hypotheses 1a and 1b are tested using both the

² No interactions were hypothesized because the relationship between PRL and PRD is indeterminate and is unlikely to systematically behave. For the remainder of the

initial likelihood assessment as well as the evaluation of individual cues. Hypotheses 2a and 2b are tested using the calculated weights placed on positive and negative evidence in reassessing the likelihood of survival.

Initial Probability Assessment

Upon viewing the initial financial information, auditors were asked, “Based solely on the information presented above, what do you believe is the likelihood that this company will be able to continue to exist for the subsequent year? (0-100%)” The mean(SD) assessment for all subjects ($n=48$) was 66.04(11.25). Thus, the average subject considered it slightly more likely than not that the experiment firm would continue to be viable for the subsequent year. Table 4 presents summary statistics between treatments and in total. An ANOVA provided support that the main effect of the PRD treatment was significant ($F(1,44) = 7.46, p < 0.01$). In addition, post-hoc comparisons indicate that auditors in the treatment condition with PRD as the only high risk evaluated the initial survival likelihood to be significantly higher than either the condition with high PRL ($F(1,44) = 7.85, p < 0.01$) only and the condition with neither high risk level ($F(1,44) = 5.37, p < 0.03$). No other treatment cells had significantly different means and no similar main effect was detected for the PRL condition. Thus, the auditors’ initial assessment of survival likelihood provides support for Hypothesis 1b, but no support for Hypothesis 1a.

document, interaction terms will not be discussed due to their lack of significance. However, the complete model will be presented in the tables.

Table 3. Perceived Risk Treatment Checks – ANOVA

Mean (SD) range	Low PRL low PRD n=12	Low PRL high PRD n=12	High PRL low PRD n=12	High PRL high PRD n=12	Total n=48
Initial assessment of litigation risk ^a	2.17 (1.64) 1-7	1.75 (0.62) 1-3	4.83 (0.72) 4-6	4.92 (0.90) 4-7	3.42 (1.80) 1-7
Initial assessment of dismissal risk ^b	1.75 (0.75) 1-3	5.67 (0.65) 4-6	2.08 (1.16) 1-5	5.92 (0.51) 5-7	3.85 (2.11) 1-7

Initial Assessment of Litigation Risk

Source of Variation	d.f.	SS	F-Score	p-value
PRL	1	102.08	92.61	<.001
PRD	1	0.33	0.30	.585
Interaction	1	0.75	0.68	.414
Error	44	48.50		
ANOVA $R^2 = .68$				

Initial Assessment of Dismissal Risk

Source of variation	d.f.	SS	F-Score	p-value
PRL	1	1.02	1.56	.218
PRD	1	180.18	275.77	<.001
Interaction	1	0.02	0.03	.859
Error	44	28.75		
ANOVA $R^2 = .86$				

PRL = Perceived risk of litigation treatment condition

PRD = Perceived risk of dismissal by client treatment condition

^a Initial assessment of litigation risk was operationalized as “Given the engagement information presented, how likely do you think it is that litigation against your firm could occur related to this client if you did not issue a modified opinion, but your client failed?” Assessment was made on a 7-point scale, with 1= “not likely”, 7= “very likely”.

^b Initial assessment of dismissal risk was operationalized as “Given the engagement information presented, how likely do you think it is that you would lose your client if you issued a modified opinion, but your client survived?” Assessment was made on a 7-point scale, with 1= “not likely”, 7= “very likely”.

Table 4. Initial Probability of Survival Assessment – ANOVA

Mean (SD) range	Low PRL low PRD n=12	Low PRL high PRD n=12	High PRL low PRD n=12	High PRL high PRD n=12	Total n=48
Initial probability assessment ^a	62.92 (13.05) 45-85	72.92 (10.54) 50-90	60.83 (9.96) 50-80	67.50 (8.12) 50-80	66.04 (11.25) 45-90
Source of variation	d.f.	SS	F-Score	p-value	
PRL	1	168.75	1.51	0.23	
PRD	1	833.33	7.46	0.01	
Interaction	1	33.33	0.30	0.59	
Error	44	4912.50			
ANOVA $R^2 = .17$					

PRL = Perceived risk of litigation treatment condition

PRD = Perceived risk of dismissal by client treatment condition

^a Initial probability assessment was based on a set of financial statements and was elicited as “Based solely on the information presented above, what do you believe is the likelihood that this company will be able to continue to exist for the subsequent year? (0-100%)”

Individual Cue Evaluation

After viewing the financial statements, auditors were given the opportunity to search a database containing 24 different information cues. The cues were designed to include all information previously documented to be relevant to the going-concern modification decision (LaSalle and Anandarajan 1996, Mutchler, et al 1997). The cues were searched for using a search engine designed with key words related to the various cues. The search engine was designed and cues were combined such that no more than two cues would be recovered with each search³. Of the 24 cues, 21 were viewed by at least one

³ The auditors’ searches were productive as there were very few incidents of empty searches, and only two auditors reported being unable to find a piece of information they deemed relevant. In one case, this was due to a spelling error by the auditor. In the other

auditor. A summary of the number of auditors viewing the information cues and the mean evaluations, is presented in Table 5.

Table 5. Information Cues and Evaluation by Treatment

	Mean evaluation ^a (number of subjects viewing)				
	Low PRL low PRD	Low PRL high PRD	High PRL low PRD	High PRL high PRD	ALL SUBJECTS
Financing/liquidity	-1.22(9)	-1.11(9)	-2.00(9)	-1.45(11)	-1.44(38)
Subsequent events	-2.67(6)	-1.57(7)	-3.25(8)	-2.80(10)	-2.61(31)
Trading securities	-2.60(5)	-1.57(7)	-3.00(7)	-2.13(8)	-2.30(27)
Long-term debt	1.00(5)	1.60(5)	0.00(6)	1.00(6)	0.86(22)
Acquisition	3.00(4)	2.60(5)	0.16(6)	2.57(7)	1.77(22)
Receivables	—	-0.33(3)	-1.40(5)	-0.75(8)	-0.87(16)
Markets/products	—	2.50(4)	2.20(5)	0.75(4)	1.85(13)
Inventory	—	-0.50(2)	-1.00(6)	-0.40(5)	-0.69(13)
Management plans	0.00(1)	3.00(1)	0.67(3)	1.00(5)	1.00(10)
Competition	-1.00(2)	-1.00(2)	-2.00(1)	-1.00(4)	-1.11(9)
Accrued expenses	0.00(1)	0.00(2)	0.00(2)	-1.00(3)	-0.37(8)
Solvency	-1.50(2)	-1.00(2)	3.00(1)	-2.00(2)	-0.85(7)
Restructuring	0.00(1)	0.00(2)	—	2.00(3)	1.00(6)
Employees	3.00(1)	—	1.00(1)	1.33(3)	1.60(5)
Cash generation	2.00(1)	—	2.00(1)	0.00(2)	1.00(4)
Order backlog	—	—	-0.33(3)	—	-0.33(3)
I/S and cash flows	—	—	0.00(1)	0.00(2)	0.00(3)
Asset sales	—	—	1.00(1)	1.00(1)	1.00(2)
R & D	—	—	0.00(1)	0.00(1)	0.00(2)
Marketing	—	0.00(1)	—	—	0.00(1)
Facilities	—	-3.00(1)	—	—	-3.00(1)

PRL = Perceived risk of litigation treatment condition

PRD = Perceived risk of dismissal by client treatment condition

Note: Subjects searched by keyword and were given a list of available information related to their searches. There were 24 potential information cues available and subjects were allowed to continue searching until they determined they had gathered enough information. All information cues, as well as the keywords that would locate the cues are listed in Appendix A. The information is sorted by number of times viewed. Three cues not viewed (legal information, suppliers, profitability) are not listed in the table.

^a Subjects evaluated the information based on the question “In relationship to the ability of Highpoint to continue as a going-concern, how would you rate the evidence you are viewing on this page?” The answers were on an 11-point scale from -5 = “very negative” to 5 “very positive”.

case, the subject searched for information related to an IPO/equity issuance that was not referred to in the case.

As was expected, most subjects ($n=38$) searched for and obtained information regarding the company's financing options. In addition, most subjects sought out information related to subsequent events, certain specific current assets, and long-term debt. Five cues were viewed by 20 or more subjects and 9 cues were viewed by 10 or more subjects. Subsequent to viewing an individual cue, the auditors were asked, "In relationship to the ability of Highpoint to continue as a going-concern, how would you rate the evidence you are viewing on this page?" The answers were on an 11-point scale from -5 = "very negative" to 5 = "very positive". The distribution of negative and positive cues among the most-viewed cues was generally even. The ratio of negative to positive cues among the top five viewed cues was 3:2. Similarly, of the nine cues viewed by 10 or more subjects, five were evaluated as negative, the remaining 4 were evaluated as positive.

To further test Hypotheses 1a and 1b, the five cues viewed by 20 or more subjects were analyzed separately for treatment effects on the evaluation. Table 6 shows the results of these tests. The evidence is mixed. For the most-viewed cue, financing and liquidity information, there is no evidence of a treatment effect. The mean evaluation was -1.44 , but this mean did not differ significantly between treatments. The second most viewed cue was a subsequent events cue evaluated by 31 auditors, with a mean evaluation of -2.61 . There was strong evidence of differential evaluation among treatment conditions. An ANOVA showed a strong main effect for the high PRL treatment ($F(1,27) = 13.65, p < 0.001$), as well as a strong main effect for the high PRD condition ($F(1,27) = 9.93, p < 0.01$). The effects were in the hypothesized directions. A third piece of evidence was information surrounding trading securities owned viewed by

27 auditors. The mean evaluation was -2.30 . A strong main effect was found for the high PRD treatment ($F(1,23) = 8.64, p < 0.01$), with the subjects facing high PRD evaluating the evidence as less negative. No effect was found for the high PRL treatment ($p < 0.15$). The fourth piece of evidence involved the long-term debt of the experimental firm. This evidence was viewed by 22 subjects with a mean evaluation of 0.86 . Both the high PRL treatment ($F(1,18) = 5.61, p < 0.03$) and the high PRD treatment ($F(1,18) = 5.61, p < 0.03$) had the hypothesized effect on evaluation of the evidence. The final cue viewed by 20 or more auditors related to an acquisition made by the client. The evidence was viewed by 22 auditors with a mean evaluation of 1.77 . The main effect for PRL was significant and in the predicted direction ($F(1,18) = 5.14, p < 0.04$). No similar effect was found for PRD ($p = 0.13$)⁴.

Overall, the results for Hypotheses 1a and 1b are mixed. The initial probability assessment supports Hypothesis 1b, but does not support Hypothesis 1a. The evaluation for the individual cues also produced mixed results. Hypotheses 1a and 1b were each supported by three of the five cue evaluations made by 20 or more auditors. There are several potential explanations for the mixed results. First, the power of these tests was low. Because the experiment was designed to allow a more realistic search for evidence (and hence more powerful tests on information search termination), the number of auditors viewing each piece of information was limited. A second potential explanation for the mixed results involves the search strategies and relevant evidence given the risks involved. It is possible that auditors facing one or more of the risks may have considered

⁴ There were four additional cues viewed by 10-16 auditors. In only one was the information viewed in all treatments (Management Plans). The treatment for PRD was significant ($F(1,12) = 9.87, p = .02$).

some evidence more relevant than other evidence given the risks involved. Hence, some information cues may not have provided additional relevant evidence based on the risks involved.

The results presented here provide some evidence, although mixed, that auditors do evaluate information differentially based on risks. Over half of the individual cues viewed by 20 or more auditors showed evidence supporting Hypotheses 1a and 1b. Further research controlling the order of evidence and the evidence viewed would be likely to provide more conclusive and powerful tests of the effects of risk on evidence evaluation.

Updating of Likelihood Assessments

In addition to affecting the evaluation of individual information cues, it was hypothesized that perceived risks would have an effect on the weights placed on positive and negative information in updating likelihood assessments. First, because perceived risk may cause an auditor to have a preference for one decision outcome, Hypothesis 2a suggested that auditors facing high PRL would place a higher weight on negative information and a lower weight on positive information than auditors not facing high PRL. Likewise, Hypothesis 2b suggested that auditors facing high PRD would place a higher weight on positive information and a lower weight on negative information than auditors not facing high PRD.

Using the belief adjustment model, α , the weight placed on negative information, and β , the weight placed on positive information, were estimated for each subject. The mean values within the treatment conditions and planned comparisons are presented in Table 7. The overall mean (SD) for α was 0.24 (0.16) and the overall mean

for β was 0.37 (0.23). The weight placed on positive information was higher than the weight placed on negative information overall ($t=3.25$, $p < 0.01$). One possibility for this result is an overall framing by auditors towards viability, as suggested by the auditing standards. The framing of a situation can cause a decision maker to evaluate evidence in the direction of the framing (Hogarth and Einhorn 1992). Alternatively, since auditors made their first likelihood assessment subsequent to viewing financial statement information and company background information, the prior information could also affect the overall weighting of positive and negative evidence (Hogarth and Einhorn 1992).

The primary tests relating to the weighting of evidence relate to the effects of perceived risk. As shown in Table 7, auditors facing high PRD placed substantially less weight on negative evidence than did auditors not facing high PRD ($F(1,44) = 6.13$, $p < 0.02$). This is consistent with auditors having a confirmation bias towards issuing an unmodified opinion. Auditors facing high PRD substantially ignored negative information. This finding provides partial support for Hypothesis 2b. Similarly, auditors facing high PRL placed substantially less weight on positive evidence than did auditors not facing high PRL ($F(1,44) = 15.71$, $p < 0.01$). This is consistent with a confirmation bias towards a modified opinion, providing partial support for Hypothesis 2a.

Table 6. Differential Information Evaluation by Treatment and Cue – ANOVA – Information Evaluation

Financing/Liquidity				
Source of variation	d.f.	SS	F-Score	p-value
PRL	1	2.96	1.97	0.170
PRD	1	1.02	0.68	0.417
Interaction	1	0.44	0.30	0.590
Error	34	51.17		
ANOVA $R^2 = .08$				
Subsequent Events				
Source of variation	d.f.	SS	F-Score	p-value
PRL	1	6.14	13.65	0.001
PRD	1	4.47	9.93	0.004
Interaction	1	0.77	1.73	0.199
Error	27	12.15		
ANOVA $R^2 = .48$				
Trading				
Source of variation	d.f.	SS	F-Score	p-value
PRL	1	1.49	2.17	0.154
PRD	1	5.93	8.64	0.007
Interaction	1	0.04	0.06	0.815
Error	23	15.79		
ANOVA $R^2 = .33$				
Long-term Debt				
Source of variation	d.f.	SS	F-Score	p-value
PRL	1	3.49	5.61	0.029
PRD	1	3.49	5.61	0.029
Interaction	1	0.21	0.35	0.561
Error	18	11.20		
ANOVA $R^2 = .40$				
Acquisition				
Source of variation	d.f.	SS	F-Score	p-value
PRL	1	10.78	5.14	0.036
PRL	1	5.29	2.52	0.130
Interaction	1	10.36	4.94	0.039
Error	18	37.75		
ANOVA $R^2 = .43$				

PRL = Perceived risk of litigation treatment condition

PRD = Perceived risk of dismissal by client treatment condition

Note: A cue was chosen for ANOVA evaluation only if it was viewed by at least 20 subjects. There were four additional cues viewed by 10-16 subjects. In only one was the information viewed in all treatments (Management Plans). The treatment for PRD was significant in that cue ($F(1,12) = 9.87, p = 0.02$).

Table 7. Weighting of Positive and Negative Information Cues -ANOVA

Mean (SD)	Low PRL low PRD n=12	Low PRL high PRD n=12	High PRL low PRD n=12	High PRL high PRD n=12	Total n=48
α^a	0.30 (0.23)	0.14 (0.11)	0.31 (0.13)	0.23 (0.12)	0.24 (0.16)
β^b	0.52 (0.13)	0.52 (0.25)	0.24 (0.20)	0.28 (0.19)	0.37 (0.23)

Weight placed on negative evidence, α

Source of Variation	d.f.	SS	F-Score	p-value
PRL	1	0.02	0.98	0.329
PRD	1	0.15	6.13	0.018
Interaction	1	0.02	0.76	0.388
Error	44	0.95		

ANOVA $R^2 = .16$

Weight placed on positive evidence, β

Source of Variation	d.f.	SS	F-Score	p-value
PRL	1	0.65	15.71	< 0.001
PRD	1	0.00	0.08	0.777
Interaction	1	0.01	0.13	0.725
Error	44	1.53		

ANOVA $R^2 = .31$

PRL = Perceived risk of litigation treatment condition

PRD = Perceived risk of dismissal by client treatment condition

^a α represents the weight placed on negative evidence in the belief adjustment model.
 $0 \leq \alpha \leq 1$.

^b β represents the weight placed on positive evidence in the belief adjustment model.
 $0 \leq \beta \leq 1$.

No support was found for the hypothesis that auditors facing high PRD would place more weight on positive information than auditors not facing PRD ($F(1,44) = 0.08$, $p = 0.77$), nor for the hypothesis that auditors facing high PRL would place more weight on negative information than auditors not facing high PRL ($F(1,44) = 0.98$, $p = 0.33$). One explanation is that auditors either consider information relevant and appropriately

update their beliefs or consider the information to be less relevant and underweight their belief revision. This explanation is consistent with a confirmation bias. In this scenario, information would not be over-weighted and no results would be expected for the two non-supported hypotheses.

Overall, some support is found for both Hypothesis 2a and 2b. Auditors tend to place less relevance on information that does not support the decision that is most in line with their perceived risk. However, no support is found for the companion hypothesis that auditors will place more weight on information consistent with their beliefs.

Search Termination

Termination Threshold

In addition to affecting the evaluation of evidence viewed, it was hypothesized that increased risks may have two effects on the information search process of an experienced auditor. First, because the increased risk may increase the expected costs involved with being incorrect, it was hypothesized that auditors may require more extreme likelihood assessments before terminating information search and making a decision. Specifically, because of the increased cost of incorrectly issuing an unmodified opinion, Hypothesis 3a suggested that auditors facing high PRL would require a higher assessed likelihood of survival before terminating information search and issuing an unmodified opinion. Similarly, Hypothesis 3b suggested that auditors facing high PRD would require a lower assessed likelihood of survival before terminating information search and issuing a modified opinion.

Table 8 presents results related to the probability of survival at the termination of information search. The mean (SD) threshold upon issuance of an unmodified opinion was 72.60 (10.12). The mean (SD) threshold upon issuance of a modified opinion was 42.43 (13.25). However, no main effect is found to support either Hypothesis 3a ($F(1,21) = 0.26, p < 0.62$) or Hypothesis 3b ($F(1,19) = 1.99, p < 0.18$). Although the results indicate that for all subjects there is a large effect of both PRL ($F(1,44) = 7.15, p = 0.01$) and PRD ($F(1,44) = 6.79, p = 0.01$) on the probability of survival at termination, there is no evidence that either risk affected the termination threshold for issuing a report.

One possibility for the lack of significant results is that the termination threshold is contingent on the number of cues viewed, as presented in Figure 2. Thus, the test performed is a proxy for the true test. To properly test the hypothesis would require a test comparing termination thresholds under perceived risk contingent upon the number of cues viewed. However, this would require testing each termination point (e.g. conditional on number of cues viewed) separately and would require a much larger experimental group. A more detailed test of the termination aspect of decision-making under risk presented in Figure 2 may be more realistically accomplished in a more generic setting not requiring experienced auditors.⁵

Alternatively, not finding results for this hypothesis is actually encouraging about the potential for developing decision aids for auditors. While the risks in the situation had a large effect on the eventual survival probability reached by the auditors, there is no evidence that the auditors altered their threshold levels. This termination behavior is in

⁵ As an alternative to a statistical test, I graphed the likelihood of survival upon termination contingent upon number of cues viewed (similar to Figure 3) and the perceived risks. Unfortunately, decisions were clustered by treatment condition and thus

line with auditing standards. It is likely that auditors have a level that they consider to be “substantial doubt”. The search termination results presented indicate that there is no evidence of auditors adjusting their decision criteria for PRL or PRD. This provides some indication that we can focus our attention on information evaluation effects of risk. Alternatively, this could provide evidence that auditors alter their stated assessments to reach the conclusions desired, or that the test was not powerful enough to detect a difference.

Amount of Evidence Acquired

The second hypothesis related to information search termination involves the amount of evidence required to reach a decision. Hypothesis 4a predicted that the increased cost of incorrectly issuing an unmodified opinion would result in auditors facing high PRL searching longer for evidence before issuing an unmodified opinion than auditors not facing high PRL. Likewise, Hypothesis 4b predicted that auditors facing high PRD would search longer before issuing a modified opinion than auditors not facing high PRD. Two dependent variables were used to test the hypotheses. First, total decision time, measured in seconds, was used. The time was measured from when the subjects were first shown the financial statements until the time when they issued an audit report. While this measure provides a continuous amount of time spent on the decision, it can be affected by error terms such as reading time. To provide an alternative measure, the number of information cues viewed by the auditor was also used as a dependent variable.

no evidence supporting a differential threshold was seen. Therefore, the figure is not presented.

Table 8. Probability of Survival at Termination of Search - ANOVA

Mean ^a (SD) range	Low PRL low PRD	Low PRL high PRD	High PRL low PRD	High PRL high PRD	Total
Unmodified opinion	70.83 (15.30) 50-90 n=6	75.50 (10.12) 60-95 n=10	71.67 (7.64) 65-80 n=3	70.00 (4.47) 65-75 n=6	72.60 (10.12) 50-95 n=25
Modified opinion	44.17 (9.70) 30-55 n=6	55.00 (7.07) 50-60 n=2	37.22 (15.23) 10-55 n=9	44.33 (13.29) 20-55 n=6	42.43 (13.25) 10-60 n=23
All subjects	57.50 (18.53) 30-90 n=12	72.08 (12.33) 50-95 n=12	45.83 (20.54) 10-80 n=12	57.17 (16.40) 20-75 n=12	58.15 (19.14) 10-95 n=48

Unmodified Report

Source of variation	d.f.	SS	F-Score	p-value
PRL	1	28.41	0.26	0.617
PRD	1	11.74	0.11	0.747
Interaction	1	52.32	0.48	0.498
Error	21	2310.00		
ANOVA $R^2 = .06$				

Modified Report

Source of Variation	d.f.	SS	F-Score	p-value
PRL	1	328.39	1.91	0.183
PRD	1	340.94	1.99	0.175
Interaction	1	14.67	0.09	0.773
Error	19	3259.72		
ANOVA $R^2 = .16$				

All Subjects

Source of Variation	d.f.	SS	F-Score	p-value
PRL	1	2120.02	7.15	0.011
PRD	1	2015.02	6.79	0.012
Interaction	1	31.69	0.11	0.745
Error	44	13049.25		
ANOVA $R^2 = .24$				

PRL = Perceived risk of litigation treatment condition

PRD = Perceived risk of dismissal by client treatment condition

^a The probability of survival at termination is measured as the final survival likelihood assessment prior to the issuance of an audit report.

Table 9 presents the results for total decision time by report type and treatment. The overall mean (SD) time spent on the decision was 702.94 (254.99) seconds. Hypothesis 4a was supported by the evidence ($F(1,21) = 5.00, p < 0.04$). The auditors facing high PRL spent significantly more time prior to issuing an unmodified opinion than auditors not facing PRL. Hypothesis 4b was not supported ($F(1,19) = 2.78, p < 0.12$). The likely inflation of the error term by variables such as reading time and processing time likely contributed to the high standard deviations and lack of significant results for total decision time for PRD. It should be noted that PRL had no significant effect on total decision time for subjects issuing a modified opinion ($F(1,19) = 0.96, p < 0.34$), nor did PRD have any significant effect on decision time for subjects issuing an unmodified report ($F(1,21) = 0.66, p < 0.43$). Thus, the time spent on decisions consistent with the direction of the perceived risks does not appear to be affected.

Table 10 presents results related to the alternative measure of amount of evidence, the number of information cues viewed by report type and treatment. The mean (SD) number of information cues viewed by all subjects was 5.10 (2.34). The evidence supports both Hypothesis 4a and Hypothesis 4b. Auditors issuing an unmodified report viewed significantly more cues ($F(1,21) = 6.14, p < 0.03$) when faced with high PRL than auditors not facing high PRL. Likewise, auditors issuing a modified report viewed significantly more cues ($F(1,19) = 8.89, p < 0.01$) when faced with high PRD than auditors not facing high PRD.

Table 9. Total Decision Time by Report Type and Treatment - ANOVA

Mean ^a (SD) range	Low PRL low PRD	Low PRL high PRD	High PRL low PRD	High PRL high PRD	Total
Unmodified opinion	613.83 (213.05) 321-814 n=6	575.70 (121.94) 347-749 n=10	690.00 (350.24) 299-975 n=3	858.33 (140.75) 716-1037 n=6	666.40 (206.83) 299-1037 n=25
Modified opinion	495.50 (162.61) 282-760 n=6	894.00 (190.92) 759-1029 n=2	802.00 (368.92) 492-1734 n=9	850.33 (194.17) 623-1059 n=6	742.65 (298.45) 282-1734 n=23
All subjects	554.67 (190.97) 282-814 n=12	628.75 (175.59) 347-1029 n=12	774.00 (351.93) 299-1734 n=12	854.33 (161.74) 623-1059 n=12	702.94 (254.99) 282-1734 n=48

Unmodified Report

Source of Variation	d.f.	SS	F-Score	p-value
PRL	1	167918.40	5.00	0.036
PRD	1	22111.36	0.66	0.426
Interaction	1	55602.37	1.66	0.212
Error	21	1026726.00		

ANOVA $R^2 = .31$

Modified Report

Source of Variation	d.f.	SS	F-Score	p-value
PRL	1	73144.97	0.96	0.339
PRD	1	211404.74	2.78	0.112
Interaction	1	129829.44	1.71	0.207
Error	19	1959563.22		

ANOVA $R^2 = .26$

All Subjects

Source of variation	d.f.	SS	F-Score	p-value
PRL	1	593852.52	10.93	< 0.01
PRD	1	71533.52	1.32	0.26
Interaction	1	117.19	0.00	0.96
Error	44	2390437.58		

Planned comparison

High both vs not high both	1	366731.17	6.75	0.01
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ANOVA $R^2 = .22$

Table 9 (continued)

PRL = Perceived risk of litigation treatment condition

PRD = Perceived risk of dismissal by client treatment condition

^a Time is measured as seconds from the beginning of the decision process, coded as the time the subject first viewed the financial statements, to the end of the decision process, coded as the issuance of an audit report.

The results seem to indicate that high risks do increase the amount of evidence gathered by auditors prior to making a decision that contradicts a salient risk. This is likely to be the result of several factors. First, since auditors appear to evaluate evidence more in line with minimizing their perceived risks, it would take more evidence to convince an auditor to make a decision less in line with risks. In addition, more evidence is likely required for auditors to feel confident in their decision when risks are in the opposing direction to that decision.

Conflicting Risk

Hypothesis 6 suggests that the combination of risk factors should result in increased time for the issuance of any audit report. A planned comparison of the high PRL, high PRD treatment group with all other treatments provides support for this hypothesis. The overall mean for the total decision time in the high risk cell was 854.33, which was significantly higher ($F(1,44) = 6.75, p < 0.02$) than the mean time of 652.47 spent in the other three cells. In addition, the mean number of cues viewed in the high risk cell was 7.08, which is significantly higher ($F(1,44) = 17.37, p < 0.01$) than the mean for the other three cells, 4.45. These tests provide further evidence that perceived risks increase the decision time and amount of evidence gathered prior to making a decision that opposes one or more salient risks.

Table 10. Number of Information Cues Viewed by Report Type and Treatment

Mean ^a (SD) range	Low PRL low PRD	Low PRL high PRD	High PRL low PRD	High PRL high PRD	Total
Unmodified opinion	4.33 (1.75) 2-7 n=6	4.20 (1.62) 1-7 n=10	6.00 (3.61) 2-9 n=3	6.67 (1.51) 5-9 n=6	5.04 (2.09) 1-9 n=25
Modified opinion	2.17 (1.33) 0-3 n=6	5.50 (4.95) 2-9 n=2	5.56 (1.24) 4-7 n=9	7.50 (1.87) 5-10 n=6	5.17 (2.62) 0-10 n=23
All subjects	3.25 (1.86) 0-7 n=12	4.42 (2.15) 1-9 n=12	5.67 (1.87) 2-9 n=12	7.08 (1.68) 5-10 n=12	5.10 (2.34) 0-10 n=48

ANOVA – Unmodified Report

Source of variation	d.f.	SS	F-Score	p-value
PRL	1	22.28	6.14	0.022
PRD	1	0.37	0.10	0.752
Interaction	1	0.83	0.23	0.637
Error	21	76.27		

ANOVA $R^2 = .27$

ANOVA – Modified Report

Source of variation	d.f.	SS	F-Score	p-value
PRL	1	30.75	9.27	0.007
PRD	1	29.49	8.89	0.008
Interaction	1	2.04	0.62	0.442
Error	19	63.06		

ANOVA $R^2 = .58$

ANOVA – All Subjects

Source of variation	d.f.	SS	F-Score	p-value
PRL	1	77.52	21.49	< 0.001
PRD	1	20.02	5.55	0.023
Interaction	1	0.19	0.05	0.821
Error	44	158.75		

Planned comparison

High both vs not high both 1 62.67 17.37 < 0.001

ANOVA $R^2 = .38$

Table 10 (continued)

PRL = Perceived risk of litigation treatment condition

PRD = Perceived risk of dismissal by client treatment condition

^a The number of information cues viewed refers to the total number of different cues, excluding the financial statements, that the subject searched for and viewed.

Report Issuance

Table 11 provides final reporting decisions by the auditors. The case appears to be appropriately ambiguous as 25 auditors reached a decision to leave the report unmodified and 23 modified the report. Hypotheses 5a and 5b predicted that auditors facing high PRL would be more likely to modify the audit report and auditors facing high PRD would be more likely to leave the report unmodified. The results support these hypotheses. A logistic analysis supported the hypothesis that high PRL is more likely to result in a modified audit opinion than low PRL ($\chi^2=4.94$, $p < 0.03$). In addition, auditors facing high PRD were more likely to issue an unmodified audit opinion than auditors not facing high PRD ($\chi^2=4.94$, $p < 0.03$). Neither ex-ante PRL nor ex-ante PRD were significant as covariates in the model, indicating that the treatment variables and not prior experience were driving the results⁶.

⁶ Ex-ante risk was assessed by inquiring the subject's perceived likelihood of each type of risk prior to any discussion of the experimental task. The information was collected with other background information.

Table 11. Report Issuance

	Low PRL low PRD	Low PRL high PRD	High PRL low PRD	High PRL high PRD	Totals
Unmodified	6 (50%)	10 (83.3%)	3 (25%)	6 (50%)	25 (52.1%)
Modified	6 (50%)	2 (16.7%)	9 (75%)	6 (50%)	23 (47.9%)
	n=12	n=12	n=12	n=12	n=48

Logistic analysis – Final Report Issuance

Comparison	χ^2	p-value
High PRL vs low PRL	4.94	0.026
High PRD vs low PRD	4.94	0.026
Interaction of PRL and PRD	0.10	0.751

PRL = Perceived risk of litigation treatment condition

PRD = Perceived risk of dismissal by client treatment condition

Summary and Implications

The results presented above provide some initial evidence about the effects of risk on the decision process of decision-makers bound by professional standards.

Experienced auditors were given the task of searching for information cues and issuing an audit opinion for a company facing a high level of financial distress. Perceived risk of litigation and perceived risk of dismissal by the client were successfully manipulated in an experiment using four treatment conditions. These perceived risks affected the amount of information the auditors searched for, the elicited evaluation of evidence, the computed weight placed on the evidence in updating probabilities, and the auditors' final reporting decision.

Mixed support was found for the hypothesis that auditors would evaluate information consistent with the reporting decision most in line with perceived risk. Auditors facing high perceived risk of dismissal by the client assessed the likelihood of corporate survival to be significantly higher than auditors not facing high perceived risk of dismissal after viewing an initial set of financial statements. In addition, for information cues selected and viewed by a large number of auditors, auditors facing high perceived risk of dismissal evaluated individual cues as more positive (less negative) than auditors not facing high perceived risk of dismissal for three of the five cues tested. Likewise, auditors facing high perceived risk of litigation evaluated the same individual cues as more negative (less positive) than auditors not facing high perceived risk of litigation for three of the five cues evaluated. However, contrary to a hypothesis, auditors facing high perceived risk of litigation did not evaluate the initial financial information as more indicative of failure.

Strong support was found for the hypothesis that auditors would place less weight on information that was disconfirming to the reporting decision most in line with the perceived risks. Auditors' weights placed on positive and negative evidence in updating beliefs were computed using elicited probability estimates and elicited cue evaluations. Auditors facing high perceived risk of dismissal placed significantly less weight on evidence indicating a lower likelihood of survival. Similarly, auditors facing high perceived risk of litigation placed significantly less weight on evidence indicating a higher likelihood of survival. Similar tests relating to increased weight on evidence supporting the preferred decision were not significant. These findings are in line with the

confirmation bias literature, indicating that perceived risks cause an auditor to favor confirming the less risky decision.

Strong support was also found for the hypothesis that auditors would require more evidence prior to issuing an opinion inconsistent with the perceived risks in the situation. Two separate measures, total decision time and number of cues viewed, were used as dependent variables in the analysis. Auditors facing high perceived risk of litigation spent more time and searched for more information cues prior to issuing an unmodified audit opinion and auditors facing high perceived risk of dismissal searched for more information cues prior to issuing a modified audit opinion. Auditors facing conflicting risks spent more time and searched for more cues than auditors in any other experimental condition. However, auditors making the decision in line with a single perceived risk did not spend more time or search for more cues. Prior research indicates that risk increases the time spent on a decision, but in this study the increase in time was apparent only when the decision made was not in line with the risks, or if the risks were conflicting. This finding should be further investigated in future research.

There was no evidence found that perceived risk caused auditors to adjust their decision thresholds. However, the current study could not distinguish between two potential reasons for this result. One explanation is that perceived risk does not cause auditors to adjust their decision thresholds. However, another explanation, as the decision model proposed would predict, is that the decision threshold is contingent upon available information and amount of information viewed. This study did not have the power to detect a shift of this nature because of the requirement that subjects were highly

experienced auditors. Future research should be conducted to more completely test the decision model in a setting where more subjects are available.

Finally, perceived risk led the auditors to be more likely to make the decision most in line with the perceived risks. Auditors faced with high perceived risk of litigation were more likely to issue a modified audit opinion and auditors faced with high perceived risk of dismissal were more likely to issue an unmodified audit opinion. The results in this study indicate that this finding is likely driven by information search and evaluation.

These results provide some initial evidence on the effects of risk on professionals' decision processes. Prior literature (Hackenbrack and Nelson 1996; Cuccia et al. 1995) demonstrated that risks were likely to affect the final decisions made by auditors and accountants. This study extends these results to provide evidence on the location of these risk effects. The results indicate that the auditor's decisions are affected by risk effects on information search, evaluation, and weighting of evidence. This provides some indication that decision aids may be more likely to remove biases in auditor decision-making than ex-post penalties. Further research should investigate the effects of decision aids on information search and evaluation on decisions made under risk.

This study was designed to provide some realism to a decision made by experienced auditors. To facilitate this goal of simulating the decision process, the experiment was conducted using a created search engine and the world wide web. Any effect of the methodology on the auditor's decision process cannot be separated, however some assurance is provided by the auditor's self-report of the realism of the case. In addition, the case was conducted using a very specific auditing standard, the going-

concern opinion, with highly salient risks. There is no guarantee that the findings can be generalized to other risks or other auditor decision settings. However, the findings do indicate strong effects of risk on this specific auditor decision. Conducting future extensions of the initial results reported in this study in different audit decision settings and with different types of professional decision-makers can provide additional assurance.

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APPENDIX
INSTRUMENT FOR EXPERIMENT

(Note: All pages in this instrument were created using HTML (world wide web programming language). Thus, the paper copy does not appear the same as on the instrument itself, as some numbers shift slightly, table formats do not print exactly, etc.

Thank you for visiting this page. I appreciate the time that you are taking to help with this case. The purpose of this project is to gain knowledge about the decision *process* of an auditor. Therefore, you will be asked questions about your evaluation of evidence throughout this process. Please respond and proceed through this case as you would in practice. **Because your answers will be measured throughout the case, it is essential that you do not use the back button on your browser. Doing so will prevent your responses from being recorded.**

Because this study is concerned with an individual's decision process, **it is important that you work independently from other members of your firm who are participating in the study.** Your responses will be aggregated with others and every response you make will remain anonymous. If you would like to receive a copy of the results of the study, please provide your email address at the end of the project.

I realize that your time is valuable, but your assistance with this project will further knowledge in the area of auditor decision-making. **You do not have to answer any question you do not wish to answer. Again, please do not use the back button on your browser.**

Please enter your password (listed on your e-mail) to view the scenario and virtual working papers.

Brief Questions

1. What firm do you work for?
2. What is your current position in the firm?
3. Approximately how many years have you worked in public accounting?

How likely do you think it would be for the following events to occur:

A. Fraud in a typical financial statement audit:

1	2	3	4	5	6	7
not likely						very likely

B. Fraud in a financial statement audit when the client is under financial distress:

1	2	3	4	5	6	7
not likely						very likely

C. Litigation against your firm related to a typical financial statement audit:

1	2	3	4	5	6	7
not likely						very likely

D. Litigation against your firm when your client is under financial distress:

1	2	3	4	5	6	7
not likely						very likely

E. Loss of your client following a typical financial statement audit:

1	2	3	4	5	6	7
not likely						very likely

F. Loss of your client when the client is under financial distress:

1	2	3	4	5	6	7
not likely						very likely

Introduction and Audit Issue

Following completion of fieldwork of your audit of Highpoint Computer Corporation, your staff presented the following audit issue. As the primary partner on the audit, it is your responsibility to resolve this issue and document your decision in a memo in the working papers. No other audit or accounting issues remain unresolved.

After auditing the financial statements of Highpoint, your supervising auditor has alerted you that the audit evidence indicates that the company appears to be in significant financial distress and may have difficulty continuing to operate as a going-concern.

Use the provided evidence to determine whether to modify the audit report for a going-concern uncertainty or to leave the audit report unmodified.

Note: Manipulations are combined for exposition on this printed version, only one version of each manipulated variable shows on the instrument. Litigation Risk manipulations are in bold: lower (higher). Dismissal manipulations are in bold italics: low (high)

Engagement Information

Highpoint Computer Corporation (Highpoint or The Company) manufactures and sells real-time computer systems and services directly to a diverse group of industries, including gaming, air traffic control, weather analysis, and financial market data services. Highpoint has been involved in this business for over 20 years and has personnel with significant expertise in all aspects of the area. **The Company's stock is privately owned. (The Company's common stock is traded on the NASDAQ National Market System and is followed by several large analysts.)** Your firm has conducted an audit of Highpoint for the previous six years and you were engaged again this year to conduct a regular GAAS audit for the year ended December 31, 1999. Your firm has issued an unmodified opinion each of the prior six years. Assume that you have been the primary partner on this engagement for the past three years (not including this year). **Risk management consultants at your firm indicate that it is unlikely that your firm would be subject to litigation as a result of this audit. (Risk management consultants at your firm have cautioned you that the client operates in an environment where litigation against auditors is common.)** *The original partner on the engagement recently met with management and was informally told that they intend to retain your firm as auditors in the future. (The original partner on the engagement has told you that management once indicated that they would likely hire a new auditor in the event of a modified audit opinion.)* You and your staff conducted extensive engagement planning, and as in prior years, you assessed control risk to be low.

Please answer the following questions related to this audit engagement:

Given the engagement information presented, how likely do you think it is that you would lose your client if you issued a modified opinion, but your client survived (click one)?

1	2	3	4	5	6	7
not likely						very likely

Given the engagement information presented, how likely do you think it is that litigation against your firm could occur related to this client if you did not issue a modified opinion, but your client failed (click one)?

1	2	3	4	5	6	7
not likely						very likely

Background Information

You document that during the current year, Highpoint has experienced the following significant events:

- The industry has continued to change rapidly. You note that during the year, many new competitors entered the market and several competitors failed.
- Gross sales fell 31% this year, and gross profit percentage declined from 43% to 36%.
- During 1999, the company completed the sale of one of its least cost-effective factories for liquidity purposes.
- During June, the Company acquired the real-time division from one of its largest competitors in exchange for common stock and long-term debt. The issues increased the number of shares outstanding by 33% and doubled the company's long-term debt. Management expects the acquired division to provide significant revenues in the future.

The financial statements (Balance Sheet, Income Statement, and Cash Flow Statement) follow:

Highpoint Computer Corporation
Consolidated Balance Sheet

	December 31,	
	1999	1998
<u>ASSETS</u>		
Current Assets:		
Cash and		
Equivalents	4,275	6,874
Trading Securities	12,092	
Accounts Receivable, less allowance for doubtful		
accounts of \$1,143 and \$1,434	33,538	30,547
Inventor		
ies	14,020	17,412
Other Current		
Assets	<u>2,860</u>	<u>5,164</u>
Total Current		
Assets	66,785	59,996
Property and Equipment, net	39,782	51,080
Other Long-term Assets	<u>4,088</u>	<u>6,954</u>
Total Assets	<u>110,655</u>	<u>118,031</u>
<u>LIABILITIES AND STOCKHOLDERS' EQUITY</u>		
Current		
Liabilities:		
Notes payable	7,505	9,894
Accounts payable and Accrued Expenses	54,782	42,055
Deferred Revenue	<u>5,488</u>	<u>5,809</u>
Total Current Liabilities	67,775	57,758
Long-term Debt	22,322	11,443
Other Long-term Liabilities	12,077	6,625
Common Stock, par value \$.01, authorized 100,000,000; issued		
49,424,000 and 36,223,000	494	362
Capital in Excess of Par	101,102	87,734
Value		
Accumulated		
Deficit	<u>(93,115)</u>	<u>(45,893)</u>
Total Stockholders' Equity	<u>8,481</u>	<u>42,204</u>
Total liabilities and Stockholders'		
Equity	<u>110,655</u>	<u>118,031</u>

Highpoint Computer Corporation
Consolidated Statement of Operations

	Year Ended December 31,		
	<u>1999</u>	<u>1998</u>	<u>1997</u>
Net Sales:			
Computer Systems	50,916	86,489	120,352
Service and Other	<u>64,044</u>	<u>81,684</u>	<u>94,486</u>
Total	114,960	168,173	214,837
Cost of Sales:			
Computer Systems	32,984	46,367	65,420
Service and Other	39,658	49,006	58,168
Total	<u>72,642</u>	<u>95,372</u>	<u>123,588</u>
Gross Margin	42,318	72,800	91,249
Operating Expenses:			
Research and Development	16,604	23,357	28,588
Selling, General, and Admin.	35,782	44,305	58,381
Restructuring Charge	<u>29,376</u>	<u>2,640</u>	<u>12,672</u>
Total Operating Exp.	<u>81,762</u>	<u>70,302</u>	<u>99,641</u>
Operating Income (loss)	(39,444)	2,498	(8,392)
Interest and Other Income	<u>(6,350)</u>	<u>(2,866)</u>	<u>(4,006)</u>
Loss before provision for taxes and extraordinary loss	(45,794)	(367)	(12,397)
Provision for income taxes	<u>1,860</u>	<u>2,040</u>	<u>1,560</u>
Loss before extraordinary loss	(47,654)	(2,407)	(13,957)
Extraordinary loss on extinguishment of debt	<u>0</u>	<u>0</u>	<u>(33,832)</u>
Net Loss	(47,654)	(2,407)	(47,789)
Loss per share:			
Loss before extraordinary loss	(1.56)	(0.08)	(0.49)
Extraordinary Loss	<u>0.00</u>	<u>0.00</u>	<u>(1.21)</u>
Net Loss	(1.56)	(0.08)	(1.70)

Highpoint Computer Corporation
Selected Cash Flow Information

Cash from Operating Activities	3,928	11,099	6,232
Cash from Investing Activities	(3,832)	(6,168)	(9,101)
Cash from Financing Activities	<u>(2,695)</u>	<u>(9,306)</u>	<u>(22,388)</u>
Decrease in Cash and Equivalents	(2,599)	(4,375)	(25,258)

Note: Subsequent to viewing the financial statements, subjects were asked the following questions:

Based solely on the information presented above, what do you believe is the likelihood that this company **will be able to continue to exist** for the subsequent year?(0-100%)

How confident are you about the accuracy of your likelihood assessment?

not very
confident confident

Note: This page is the initial search page. Subjects were presented the "New Search" portion of this page following every information cue.

Please search for information that you consider relevant to making your decision about which type of audit report to issue. After you input your search terms, you will be given a listing of all available items which meet your search criteria. **At no point during this task should you use the "back" button on your browser. You will be automatically returned to your most recent search following your analysis of each piece of information you view.** If you wish to review a previously viewed piece of information, please search for it again. When you have gathered enough information to make your decision on audit report type, click on the "Issue Report" Button that will be present on the search page following each piece of information you view. Words less than three letters will be ignored. Also, the searches are designed to find specific information, so be sure to be specific in your search.

New Search

Terms for which to Search:

Search

The search terms you input do not have to be complete words, but all terms must be at least three (3) characters long.

"Bal," for example, will match occurrences of balance, balances, etc.

Do not include asterisks (as in "bal*" or other non-alphanumeric characters in your search terms

unless you actually want them included (as with E&P) as part of your search.

Note: On the cues that follow, the keywords that would locate the cue are added in *italics* below the cue title. The keywords are not included on the actual experiment.

Financing and Liquidity Information

(financing liquidity funds loans liens creditors borrowings debt covenants defaults)

During 1999, Highpoint entered into a new agreement providing for a \$17.6 million credit facility which matures on September 1, 2002. As of December 31, 1999, outstanding balances under the credit facility were \$14.1 million. The loan is payable in 30 monthly installments of approximately \$150,000 beginning January 1, 2000 and ending June 1, 2002. The facility may be repaid and reborrowed at any time without penalty. The company has pledged as collateral substantially all of its assets. In the event of a sale or a sale-leaseback of its largest facility, Highpoint would be required to make a prepayment on the credit facility equal to 75% of the net proceeds from the sale. **Management has no other borrowing facilities available at the present time.**

Management expects that the acquisition of its largest competitor and its continued integration of the businesses will improve the company's liquidity through improved operating performance and the planned disposition of its largest facility. Future liquidity is highly dependent on the revenue growth expected during the upcoming period.

As of December 31, 1999, the company has \$4.3 million in cash on hand, a decrease of \$2.6 million from the prior year. However, the company holds publicly traded stock with a market value of \$12.1 million as of December 31, 1999. Management intends to sell some of this stock for liquidity purposes, should that become necessary.

Note: The following questions were asked subsequent to viewing each information cue.

In relationship to the ability of Highpoint to continue as a going-concern, how would you rate the evidence you are viewing on this page?

-5	-4	-3	-2	-1	0	1	2	3	4	5
										very
										positive
very										
negative										

After viewing the evidence presented above, what do you believe is the likelihood that this company will be able to continue to exist for the subsequent year?(0-100%)

How confident are you about the accuracy of your likelihood assessment?

-5	-4	-3	-2	-1	0	1	2	3	4	5
										very
										confident
not										
confident										

Subsequent Events and Jan/Feb Financial Data

(Subsequent Events 2000 next year future outlook january february march quarter first projections forecasts budgets)

Selected Financial Data (in thousands)

Income Statement Data

	<u>Jan-Feb, 2000</u>	<u>Jan-Feb, 1999</u>
Net Sales	18,597	19,659
Cost of Sales	<u>11,346</u>	<u>10,650</u>
Gross Margin	7,251	9,009
Other Expenses	<u>14,724</u>	<u>12,068</u>
Net Income	<u>(7,473)</u>	<u>(3,059)</u>

Balance Sheet Data

	<u>Feb. 29, 2000</u>	<u>Dec. 31, 1999</u>
Cash and Securities	7,009	16,367
Other Current Assets	49,091	50,419
Total Assets	102,397	110,655
Current Liabilities	67,809	67,775
Total Liabilities	99,389	102,174
Stockholder's Equity	2,738	8,481

Cash Flow Data

	<u>Jan-Feb, 2000</u>	<u>Jan-Feb, 1999</u>
Cash From Operations	(2,435)	25
Cash From Investing	123	556
Cash From Financing	16	<u>(1,672)</u>
Net Cash Flows	<u>(2,296)</u>	<u>(1,091)</u>

Other Subsequent Events

Highpoint entered into a contract for a sale-leaseback transaction on one of its manufacturing facilities. The transaction is expected to close later this year. 75% of the net \$4.3 million in proceeds will be used to repay a portion of the long-term debt owed to the other party in this transaction. The remaining \$1.1 million will be used for working capital purposes. The agreement is contingent upon the buyer's ability to lease approximately 100,000 square feet of area in the building to third parties and management is not assured that the transaction will be completed as contemplated.

Management states that the slow sales during the first two months are due to slower than expected transitioning with the new acquisition. However, management believes that product sales will increase as the year progresses.

During February, the company received \$2.5 million of proceeds on the sale of some trading securities it had been holding. The company recognized a \$1 million loss on the sale which is included in the net income for the first two months. In addition, the company made a \$2.7 million mark-to-market adjustment on the remaining securities (also a charge to income), which now have a book value of approximately \$5.0 million.

Trading Securities

(trading securities investments)

As of December 31, 1999, the Company possessed securities acquired as part of the acquisition of a division of a competitor. The shares are 100,000 shares of a publicly traded company on the NASDAQ, Reynold Computing, and represents a 3% interest in that company. Reynold Computing has shown a loss in each of the prior 3 years.

Subsequent to year end, the Company sold 30,000 shares for liquidity purposes. The remaining shares were marked down to market value (a \$2.7 million loss recognized during the 1st quarter) and as of February 29 have a market value of \$5.0 million.

Long-term Debt

(long term long-term debt)

The long-term debt of \$22.3 million consists of several items:

- The first relates to a credit facility, with a current balance of approximately \$14.1 million, of which \$6.5 million is classified as a current liability. The remainder is due at the rate of \$150,000 per month until it is paid off in September, 2002 in a balloon payment.
- The second note is a new \$11.0 million note signed as a result of the new acquisition. The note carries a 14% interest rate and is payable in three balloon payments beginning December, 2001.
- The remaining \$3.7 million consists of a separate credit facility, total amount of \$4.7, of which \$1.0 million is classified as a current liability. The remaining amount will be payable in annual installments for the subsequent 4 years.

Acquisition Information

(acquisition merger acquired division acquisition aquired purchase)

In June, 1999, Highpoint acquired all the assets of the Real-Time Division of Marten, Inc, a former competitor, in exchange for approximately 13,000,000 shares of stock and \$11.0 million of long-term debt. The acquisition was accounted for as a purchase. It resulted in an excess of acquired net assets over cost (negative goodwill) amounting to approximately \$9.6 million which has been allocated to reduce the values assigned to non-current assets.

In connection with the Acquisition, Highpoint recorded a \$1.7 million liability related to the estimated costs of terminating employees and exiting certain activities of the acquired business.

The company believes that the acquisition provides a number of strategic financial benefits:

- combination of the best technologies of the two businesses
- larger and more diverse market coverage
- cost savings through reducing the total employee count
- combination of production and R & D facilities
- consolidation of sales and service offices

The following unaudited pro forma financial information accounts for the acquisition as if it had occurred on January 1, 1999 and 1998, respectively (\$ in millions except per share amounts).

	<u>YEAR ENDED DECEMBER 31,</u>	
	<u>1999</u>	<u>1998</u>
Net Sales.....	144	180
Net Loss.....	(49)	(9)
Net Loss per Share.....	(1.21)	(.24)

The acquired division previously accounted for 7% of the worldwide market in real-time systems (approximately \$40.0 million in 1999). The Company expects that its plan to increase partnership with Value added resellers (VARs) will help it to maintain this market share as the worldwide market increases.

Receivables Management

(receivables ar a/r collections accounts)

	Highpoint Computer Corporation			Industry Averages		
	1999	1998	1997	1999	1998	1997
Receivables Turnover	3.59	4.67	4.97	5.65	5.95	6.22

Highpoint does not have any significant concentration of credit risk. The Company's receivables are divided among many different customers. Historically, the Company has not needed to obtain any collateral, and losses on receivables have been immaterial. The Company has a strong process for granting credit, and generally does not grant credit to less financially sound customers. According to management, the Company often waits extended periods of time for payment on Government contracts, but receives timely payment on the majority of their other receivables. Working papers show that 10% of current receivables are government related, compared to 18% at the end of the prior year. Also, the receivables turnover ratio for non-government related receivables was 4.30 in 1999, compared to 5.12 for 1998.

Markets and Products

(production manufacturing inventory markets products)

Highpoint focuses its business on several strategic target markets:

Simulation The company is recognized as a leader in the real-time systems for simulation. The newly acquired competitor was also recognized as a leader in the market. The primary applications for the simulators involve commercial and military aviation, mission planning, battle management, engineering design simulation for avionics and automotive labs, and modeling systems for synthetic environments. The company attempts to provide a real-time advantage by integrating these applications. The market for this class of products has grown at a rate of 60% over the past three years. However, the company's sales related to this product line have decreased at a rate of approximately 30% in the past three years. This product line accounted for approximately 50% of the company's sales in 1999.

Data Acquisition The company is a leading supplier of systems for radar data processing and control. For example, the company provides the computer systems which power the Department of Commerce's Radar weather programs. Other customers include the Navy and NASA. The market for this class of products has not grown significantly in the past three years. The company's sales related to this product line have decreased at a rate of 10% per year. This product line accounted for approximately 25% of the company's sales in 1999.

Interactive Real-Time Highpoint is pursuing this area which has emerged as a tremendous growth market in the past several years. The products the Company provides span such industries and gaming, hotels, and airline. The company has attempted to position itself as a supplier of servers and server technology for customers who require reliable delivery of multiple streams of high quality video. The company is the largest provider of systems for the gaming industry and public lotteries. The market for this class of products has grown at a rate of 100% over the past three years. The company's sales related to this product line have increased at a rate proportional to the market. This product line accounted for approximately 15% of the company's sales in 1999.

Telecommunications Highpoint is focusing on the rapidly expanding market for cellular data communications, wireless gateways, and internetworking systems. The company has, together with a telecommunications industry software supplier, developed a system for wireless communications that require data transfers, protocol conversions, and other interfaces with on-line service providers. The market for this class of products has grown at a rate of 60% over the past three years. The company's sales related to this product line have increased at a rate of 30% per year. This product line accounted for approximately 5% of the company's sales in 1999.

Inventory Management

(inventory turnover inventories)

	Highpoint Computer Corporation			Industry Averages		
	1999	1998	1997	1999	1998	1997
Inventory Turnover	4.62	4.92	5.18	6.39	6.08	7.25

Inventories are valued using the FIFO method. As of December 31, 1999 and 1998, respectively, components of inventories are as follows:

	December 30,	
	1999	1998
Raw Materials	\$10,547	\$12,711
Work-in-Process	422	1,288
Finished Goods	<u>3,051</u>	<u>3,413</u>
Total	<u>\$14,020</u>	<u>\$17,412</u>

At December 31, 1999, some portions of the Company's inventory were in excess of its planned requirements based upon forecasted levels of sales for the fiscal year 2000.

Accordingly, the Company has recorded a provision for inventory value. Liquidation value for the company's inventory is approximately 40% of recorded valuation.

Management's Plans Related to Financial Distress

(forecasts budgets intentions intends anticipates anticipation plans projections)

Management plans to undertake several efforts to return the company to profitability:

- Management intends to use its new alliance with their former competitor to help develop new, and expand existing, relationships for marketing and distribution of productions. Specifically, they intend to use direct sales organizations to increase their sales both domestically and internationally.
- Management intends to evaluate and manage costs and expenses by continuing to reduce general and administrative expenses.
- The company recently restructured operations, recognizing a \$29.4 million restructuring charge. Management anticipates that this restructuring, which included cutting the number of employees by 200, closing an unsuccessful plant, and various asset write-downs, will improve the efficiency of the company's operations, and allow for the company to return to profitability.

Competition

(competitors rivals industry competition)

The company operates in a highly competitive market driven by rapid technological innovation. Due in part to the range of performance and applications capabilities of its products, the company competes in various markets against a number of companies, many of which have greater financial and operating resources than the company.

Competition in the real-time computing systems market comes from four main sources: major computer companies that layer real-time hardware or software on top of their general product platforms (for example, Hewlett-Packard Corporation)

other computer companies that provide solutions for a specific characteristic of real-time, such as high-performance graphics (for example, Silicon Graphics Inc.)

general purpose computing companies that provide a platform on which third party vendors add real-time capabilities (for example, International Business Machines Corp. and Sun Microsystems, Inc.)

single board computer companies that provide processors integrated into a customer's computer system (for example, Motorola, Inc.)

The company expects that the switch from proprietary systems to standards-based systems will expand market demand, but also increase competition and make product differentiation a more important factor.

Accrued Expenses

(accrued payables expenses)

As of December 31, 1999, The Company owes approximately \$54 million in accounts payable and accrued expenses, compared to \$42 million in the prior year. The primary increase is a result of liabilities accrued related to the restructuring charge, equal to a \$12.5 million increase in restructuring liabilities. The majority of these liabilities relate to employee termination payments that will likely be made throughout the next fiscal year. During the first two months of 2000, the company has made \$4.7 in cash payments to employees related to these liabilities.

There are no other significant fluctuations in the composition of accrued expenses and other accounts payable.

Selected Solvency/Leverage Ratios

(solvency quick acid current leverage)

	Highpoint Computer Corporation			Industry Averages		
	1999	1998	1997	1999	1998	1997
Current Ratio	.99	1.04	.99	3.49	3.37	3.53
Quick (Acid-test)	.74	.65	.65	2.57	2.51	2.79
Days Sales in Inventory	78.97	74.26	70.44	57.12	60.03	50.34
Days Sales in Receiv.	101.74	78.10	73.42	64.60	61.34	58.68
Debt/Equity	12.05	1.80	2.51	.86	.90	.85

Restructuring Information

(restructuring reorganization)

The company recorded a restructuring provision of \$29.4 million during the year ended December 31, 1999. This charge included the estimated costs related to the rationalization of facilities, workforce reductions, asset writedowns (primarily facilities and inventories), and other costs. Cash payments related to the restructuring were \$4.7 million and occurred during the first quarter of 2000. The majority of the cash paid related to employee termination costs.

The company has also recorded smaller restructuring charges ranging from \$2.3 million to \$12.6 million in each year since 1994.

Human Resources

(employees management ceo cfo chief human)

The company currently has approximately 1,000 employees worldwide, with approximately 500 employed in the United States. The employees are not unionized. The company intends to reduce the total number of employees to approximately 800 by the end of the next fiscal year as part of a continuing restructuring plan.

Key Personnel

CEO/ Chairman - Edward Laudilee, 58, has over 30 years experience in manufacturing operations. He has worked with Highpoint for 18 years and has been CEO for the past 7 years. Prior to his current position, Mr. Laudilee was chief of engineering for Highpoint. His background is in simulation product development and he is known for being a pioneer in the area. Mr. Laudilee continues to provide input into new product development, although he is no longer directly involved.

CFO - Cheryl Smith, 52, has been with Highpoint for 15 years, the past 8 in the current position. She is highly respected and is a CPA with prior audit experience with a national firm.

Research and Development - James Funderburg, 42, heads a department of 40 employees actively creating and testing new products. He is considered to be an outstanding innovator and was responsible for creating the top-selling products in the simulation area. The department also employs two top developers in the real-time industry.

Marketing and Sales - Michael Wallenbach, 35, was appointed as the head of marketing 3 months prior to year end. He has worked with Highpoint for 7 years. Since taking over the department, he has attempted to partner with several Value-added resellers (VARs) to increase the worldwide distribution of the products. Mr. Wallenbach believes that although the company's products are considered to excel, it will be necessary for the success of the company to improve the distribution channels for the company's products.

Selected Cash Generating Ability Ratios

(cash generating ability)

	Highpoint Computer Corporation			Industry Averages		
	1999	1998	1997	1999	1998	1997
CFO/Current Debt	.06	.21	.08	.04	.01	.06
CFO/Total Debt	.05	.18	.07	.03	.00	.03
Cash Interest Coverage	2.69	5.10	2.90	3.67	1.93	3.17

Order Backlog

(order book orders backlog)

The company generally includes in backlog any orders that it anticipates shipping within the subsequent six months. As of December 31, 1999, order backlog was \$10.9 million, as compared to \$14.6 million for the prior year end. Management does not believe that order backlog is a useful measure of future sales or business trends because more customers are placing orders within the quarter where delivery is expected, thus backlog is a less meaningful measurement of anticipated revenue.

Asset Sales

(sale-leaseback asset leaseback saleleaseback discontinued lease disposals dispositions factory factories)

During September, 1999, the Company completed the sale of one of its Indiana facilities. The net proceeds from this transaction amounted to approximately \$2.8 million. During the quarter ended March 30, 1999, the Company recorded a non-recurring charge of \$2.0 million to adjust the book value of this facility to its fair value. Upon completion of this transaction, the Company made a mandatory prepayment of 75% of the proceeds as part of a debt agreement (50% was applied to the next six scheduled monthly payments, 50% was applied to the final maturity payment).

During the first quarter of 2000, the Company entered into a purchase and sale agreement providing for the saleleaseback of another of its Indiana facilities. The transaction is contingent on the buyer's ability to lease approximately 100,000 square feet of the 300,000 square foot facility. The transaction is expected to close during the June-December, 2000 time period. The \$6.0 million sales price will be reduced by estimated selling costs of \$0.5 million. In accordance with the terms of an agreement on the new long-term debt, the company is required to prepay 75% of the net proceeds on the sale of the facility. Accordingly, \$4.1 million will be used to repay the loan, leaving approximately \$1.3 million for working capital purposes. There is no assurance that the transaction will be completed, but there are no indications that it will not be completed.

Research and Development

(r&d research development)

The company believes that its continued success depends heavily on researching and utilizing the latest available hardware and software computer technology. Highpoint, together with its recently acquired competitor, invested \$21 million, \$28 million, and \$33 million on research and development in 1999, 1998, and 1997, respectfully. Management acknowledges that the raw amount spent on research and development have decreased, however, they believe the current investments are more targeted towards the markets upon which they are focusing. Additionally, management is intending to increase its use of joint research and development and technology sharing arrangements when the market requires parity with competitive technology.

Marketing and Distribution

(marketing distribution advertising)

Highpoint sells its systems in most major markets worldwide through both direct sales and services offices, as well as through a network of software suppliers, distributors, and system integrators. The company does not believe that it is reliant on any one distributor. The Company's primary customers are original equipment manufacturers (OEMs), independent software vendors, and value-added resellers (VARs), who combine the Company's products with other equipment/software prior to sale to end users. These customers currently account for approximately 60% of the Company's sales, with 40% going to end users. The percentage of sales to resellers is far below the industry average of 80%. The head of Marketing, who was appointed three months prior to year-end, believes that additional partnerships with VARs are critical to the success of the Company in the future.

Servicing products accounted for 55% of the Company's revenue last year. The service department consistently gets high ratings from customers and is considered an important part of the Company's future success. Currently, the servicing department does not attempt to sell new products, however, the company is considering implementing a bonus plan for service employees who sell new products to existing customers.

Currently, the Company's largest single customer is the U.S. Government at 15% of all revenues in 1999. This is down from 30% in 1997 and 27% in 1998. No other single customer accounts for more than 10% of revenues. All contracts with the Government contain provisions for cancellation at the convenience of the Government. Substantially all of the company's sales to the Government are standard items which could be sold to others in the event of cancellation. To date, there have been no material cancellations.

Facilities Management

(facility facilities fixed equipment property buildings)

	Highpoint Computer Corporation			Industry Averages		
	1999	1998	1997	1999	1998	1997
Total Asset Turnover	1.07	1.27	1.28	1.32	1.37	1.36

Highpoint's manufacturing operations are in South Florida and Indiana. Manufacturing operations occupy approximately 60,000 square feet in the South Florida facility. The Company has entered into an agreement for the sale and partial leaseback of its Indiana facility. The transaction is expected to be completed by the end of the second quarter of fiscal 2000. Approximately 40,000 square feet are expected to be maintained in Indiana for the manufacture of only certain proprietary systems.

Utilization of manufacturing capacity is currently at 40% based on a limited two shift operation schedule during 1999. Management believes that the manufacturing capacity available at its existing facilities could be significantly increase (with minimal capital expenditures) to meet increased manufacturing requirements either by raising the utilization rate or by adding assembly personnel on its first and second shift, or by adding a third shift.

The Company's manufacturing operations are now focused on systems assembly, integration, and testing. The Company has outsourced several subassembly operations.

Legal Proceedings

(lawsuits court cases litigation litigate legal proceedings)

There are no material legal proceedings pending to which the company or any of its subsidiaries is a party or to which any of the company's or any of its subsidiaries' property is subject.

Suppliers

(suppliers)

Highpoint has many commercial suppliers throughout the world for the majority of the materials and components it uses to produce its products. There is one primary exception to this:

- The company is reliant on one supplier for the availability of two microprocessor chips which are used in the manufacture of three main products which account for 25% of the company's sales. Any delay in supplier performance may cause a delay in shipments by the company. The company estimates that it would take approximately 24 months to find an alternate supplier for these chips. The company has never had any delays relating to this supplier.

The company carefully monitors the ability of any single supplier to timely meet the company's requirements. Management believes that it has good relationships with its suppliers, including alternative suppliers, and expects that adequate sources of supply will continue to be available.

Selected Profitability Ratios

(return roa roe profitability)

	Highpoint Computer Corporation			Industry Averages		
	1999	1998	1997	1999	1998	1997
Return on Equity	N/M	N/M	N/M	9.26%	10.36%	9.94%
Return on Assets	N/M	N/M	N/M	2.67%	2.12%	3.83%
% Sales Change	-31.64%	-21.72%	-18.79%	60.64%	68.99%	84.70%
Gross Profit %	36.81%	43.29%	42.47%	39.72%	39.32%	40.57%

Report Issuance

Which type of Audit Report would you like to issue?

- * Standard Unqualified Opinion
- * Unqualified Opinion Modified for Going-concern
- * Disclaim an Opinion because of Going-concern Uncertainty

What were the primary factors affecting your decision? Please list any evidence provided that significantly influenced your decision.

How confident are you about the type of audit report you chose to issue?

-5	-4	-3	-2	-1	0	1	2	3	4	5
									very	
not									confident	
confident										

Please press here to submit your responses.

Questionnaire:

Please answer the following questions related to this audit case.

How realistic was the audit evidence provided (click one)?

1	2	3	4	5	6	7
not						very
realistic						realistic

How difficult was the task you performed in this case (click one)?

1	2	3	4	5	6	7
not						very
difficult						difficult

Given the information presented, how likely do you think it is that you would lose your client if you were to issue a modified opinion, but your client survived (click one)?

1	2	3	4	5	6	7
not						very
likely						likely

Given the information presented, how likely do you think it is that litigation against your firm could occur related to this client if you were to issue an unmodified opinion, but your client failed (click one)?

1	2	3	4	5	6	7
not						very
likely						likely

Approximately how many audits have you participated in where there was substantial doubt about the entity's ability to continue (regardless of the report type issued)?

Approximately what **percentage** of those audits resulted in a modified audit opinion?

Approximately how many times have you been involved in litigation related to an alleged inappropriate audit report?

If you have been involved in litigation, how recently? (never, within past year, not within past year)

Approximately how many times have you lost a client as a direct result of an audit decision?

If you have lost a client as a result of an audit decision, how recently? (never, within past year, not within past year)

Press here to submit your answers.

Thank you for completing my project. This page allows you to make comments about the information given to you, as well as any other general comments you may have.

Was there any information you would have liked to see that was not provided to you in this case?

What do you think I was studying in this case?

Do you have any additional comments about this case or suggestions?

If you would like to receive a copy of this study following completion, please enter your email address here:

Press  to submit your responses and exit this case.

BIOGRAPHICAL SKETCH

Allen D. Blay was born in Jacksonville, Florida, on October 20, 1970. He earned B.S. and M.S. degrees from the Fisher School of Accounting at the University of Florida in 1993. In that year, he successfully passed the Certified Public Accountant Uniform Examination and became a Certified Public Accountant. He practiced auditing with Hacker, Johnson, Cohen and Grieb, CPAs until 1995. He obtained financial support from the University of Florida to join the doctoral program in 1995, and received his degree in December, 2000.

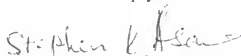
Allen's research interest is related to auditor judgment and decision-making. He is presently an Assistant Professor of Accounting at the University of California, Riverside teaching financial accounting and auditing.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.



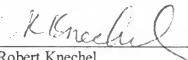
A. Rashad Abdel-khalik, Chair
Graduate Research Professor of Accounting

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.



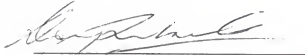
Stephen K. Asare
Professor of Accounting

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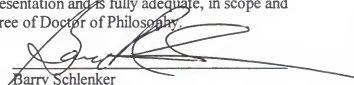
W. Robert Knechel
Professor of Accounting

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.



Doug A. Snowball
Professor of Accounting

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.



Barry Schlenker
Professor of Psychology

This dissertation was submitted to the Graduate Faculty of the Fisher School of Accounting in the College of business Administration and to the Graduate School and was accepted as a partial fulfillment of the requirements for the degree of Doctor of Philosophy.

December 2000

Dean, Graduate School